La Niña, MJO and the January-March 2012 Outlook For Denver and the Rest of Colorado

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December 24, 2011


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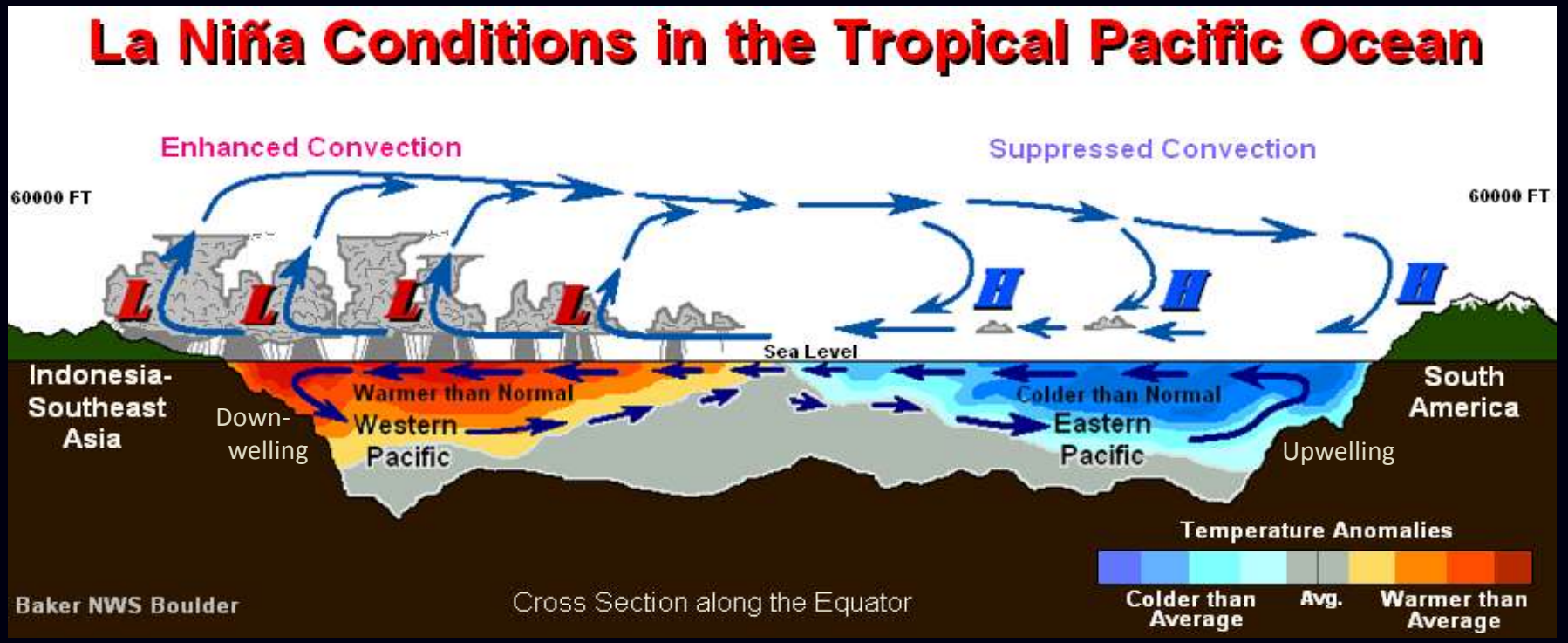
Colder than Average Ocean
Warmer than Average Ocean
La Niña Continues
Baker - NWS Boulder



La Niña Advisory

The atmospheric and oceanic circulations in the equatorial region of the Pacific Ocean during November and December of 2011 indicated the presence of weak to moderate La Niña. These circulations include enhanced/suppressed convective (thunderstorm development) over the western/eastern tropical Pacific Ocean, respectively, low-level easterly and upper level westerly wind anomalies along the Equator, and anomalously strong easterly sub-surface ocean currents which enhanced upwelling (cooling) in the eastern tropical Pacific and downwelling (warming) in the western tropical Pacific Ocean. Refer to these large scale circulations in the diagram above.

The Oceanic Niño Index - ONI

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2000	-1.6	-1.4	-1.0	-0.8	-0.6	-0.5	-0.4	-0.4	-0.4	-0.5	-0.6	-0.7
2001	-0.6	-0.5	-0.4	-0.2	-0.1	0.1	0.2	0.2	0.1	0	-0.1	-0.1
2002	-0.1	0.1	0.2	0.4	0.7	0.8	0.9	1.0	1.1	1.3	1.5	1.4
2003	1.2	0.9	0.5	0.1	-0.1	0.1	0.4	0.5	0.6	0.5	0.6	0.4
2004	0.4	0.3	0.2	0.2	0.3	0.5	0.7	0.8	0.9	0.8	0.8	0.8
2005	0.7	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.2	-0.1	-0.4	-0.7
2006	-0.7	-0.6	-0.4	-0.1	0.1	0.2	0.3	0.5	0.6	0.9	1.1	1.1
2007	0.8	0.4	0.1	-0.1	-0.1	-0.1	-0.1	-0.4	-0.7	-1.0	-1.1	-1.3
2008	-1.4	-1.4	-1.1	-0.8	-0.6	-0.4	-0.1	0	0	0	-0.3	-0.6
2009	-0.8	-0.7	-0.5	-0.1	0.2	0.6	0.7	0.8	0.9	1.2	1.5	1.8
2010	1.7	1.5	1.2	0.8	0.3	-0.2	-0.6	-1.0	-1.3	-1.4	-1.4	-1.4
2011	-1.3	-1.2	-0.9	-0.6	-0.2	0	0	-0.2	-0.4	-0.7		

El Niños (warm phase events): ONI of +0.5 and higher (red numbers)

La Niñas (cold phase events): ONI of -0.5 and lower (blue numbers)

ENSO-Neutral (near normal conditions): ONI below +0.5 and above -0.5 (black numbers)

An ONI of -0.7 is an indication of weak La Niña conditions in the tropical Pacific Ocean during the SEP-OCT-NOV 2011 climate season.

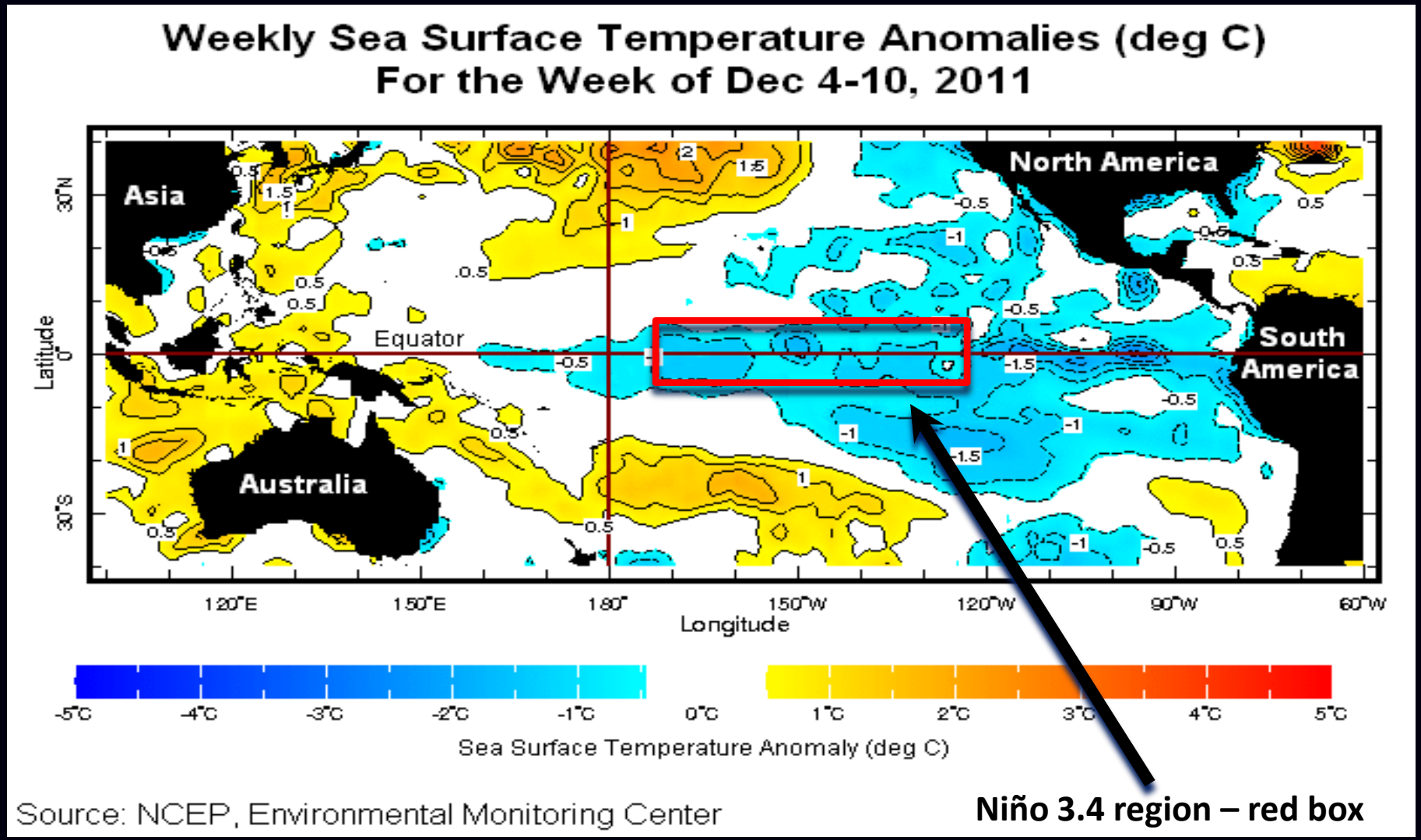
NOAA/CPC Dec 15 2011

The ONI is based on sea surface temperature (SST) departures from average in the Niño 3.4 region of the eastern tropical Pacific Ocean. It is the principal measure used by NOAA's Climate Prediction Center (CPC) for monitoring, assessing and predicting El Niño/Southern Oscillation (ENSO.)

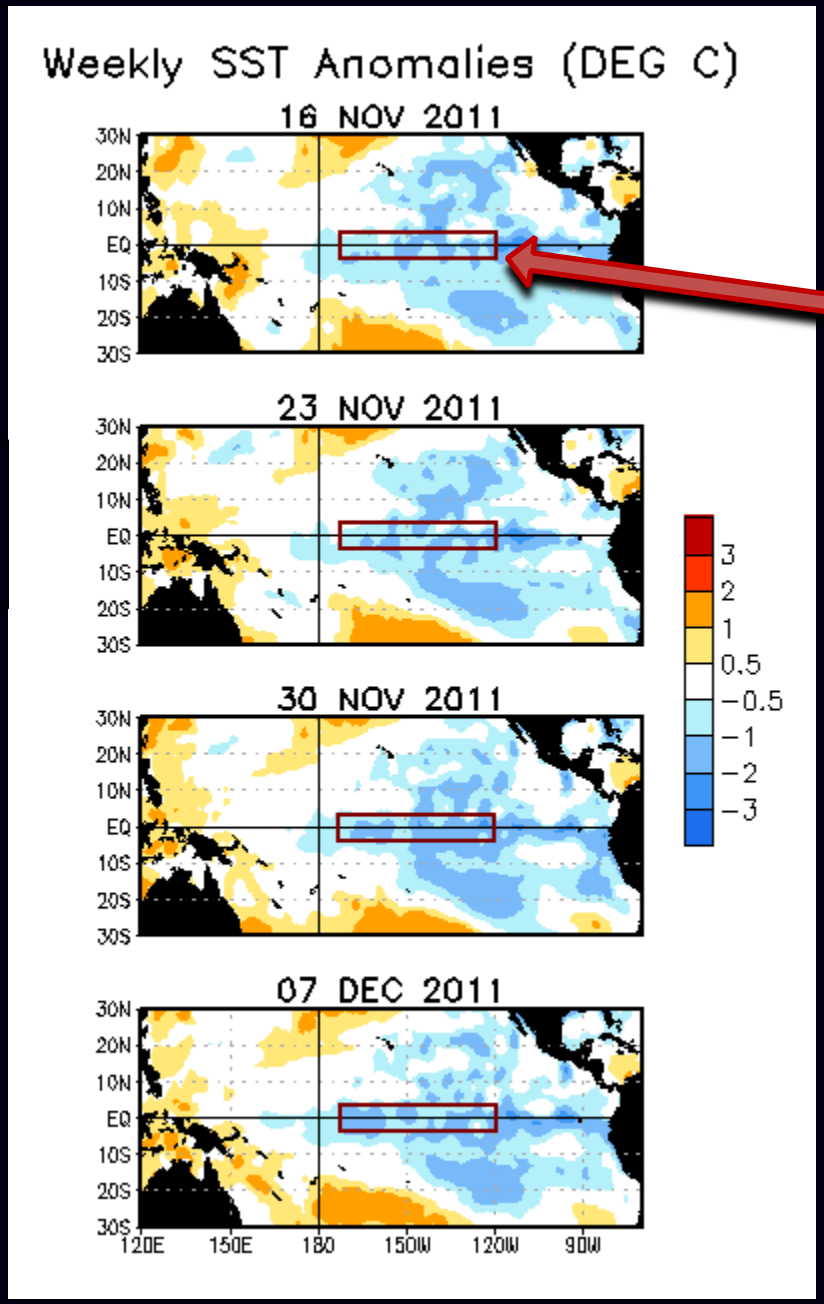
ONI is defined as the three-month running-mean SST departures in the Niño 3.4 region.

ONI is used to place current ENSO and non-ENSO events into a historical perspective.

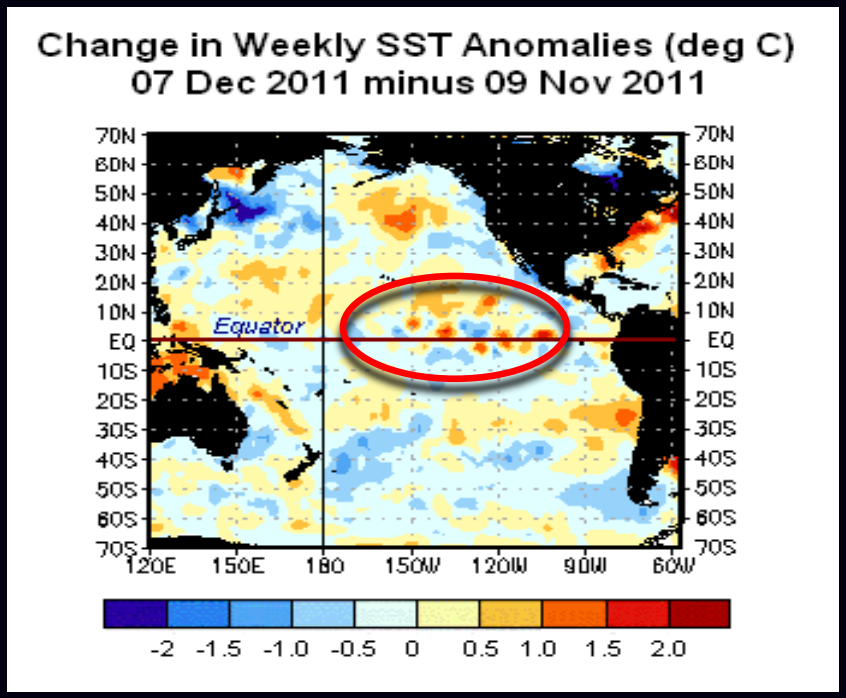
CPC's operational definitions of El Niño and La Niña are keyed to the ONI index.



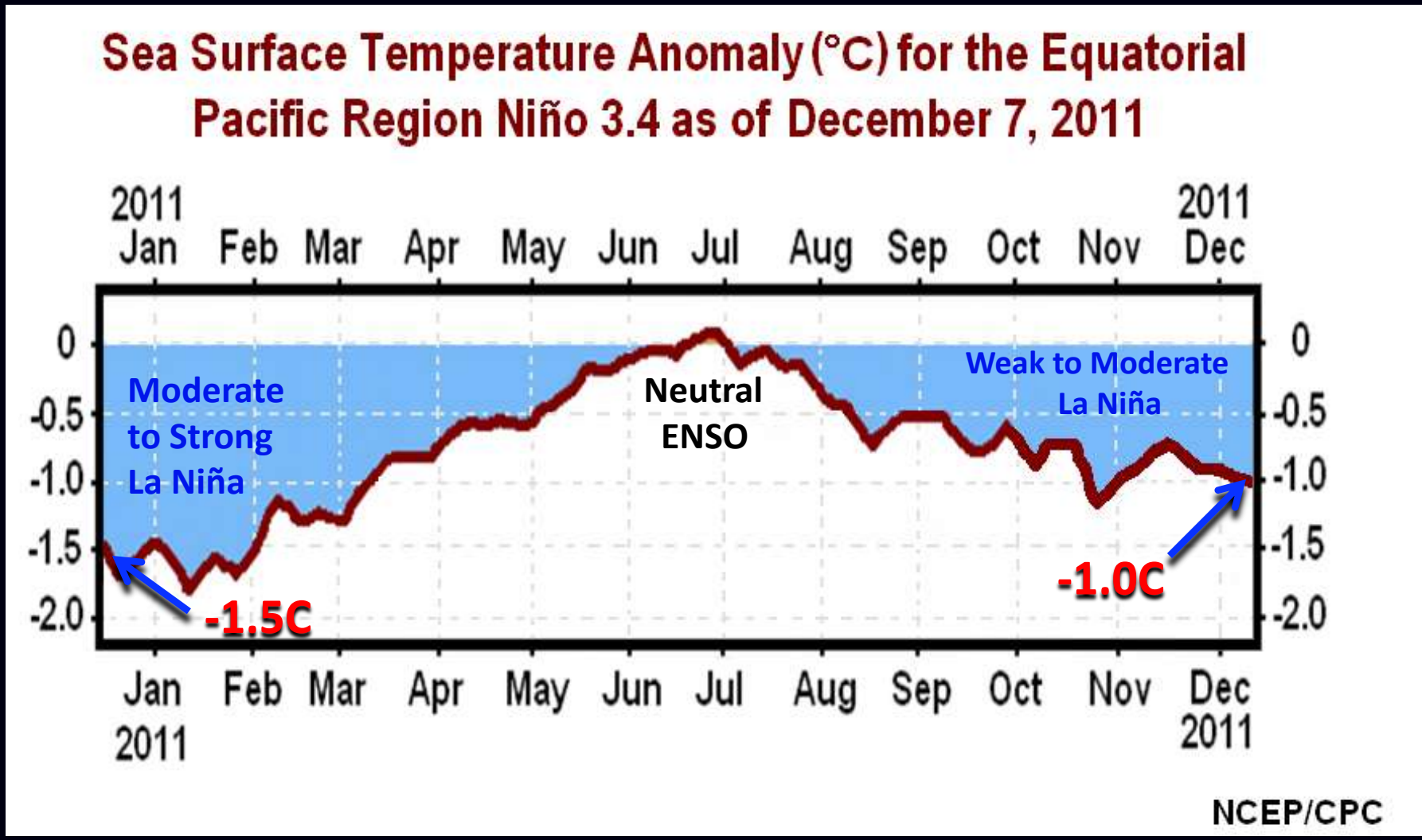
Below average sea surface temperatures (SST) were present across the central and eastern tropical Pacific Ocean during this week in December, while positive SSTs anomalies were evident in a horse shoe pattern from the southern Pacific Ocean to the Philippines and Papua New Guinea in the western Pacific, and up across the northern Pacific Ocean to the western tip of Alaska.



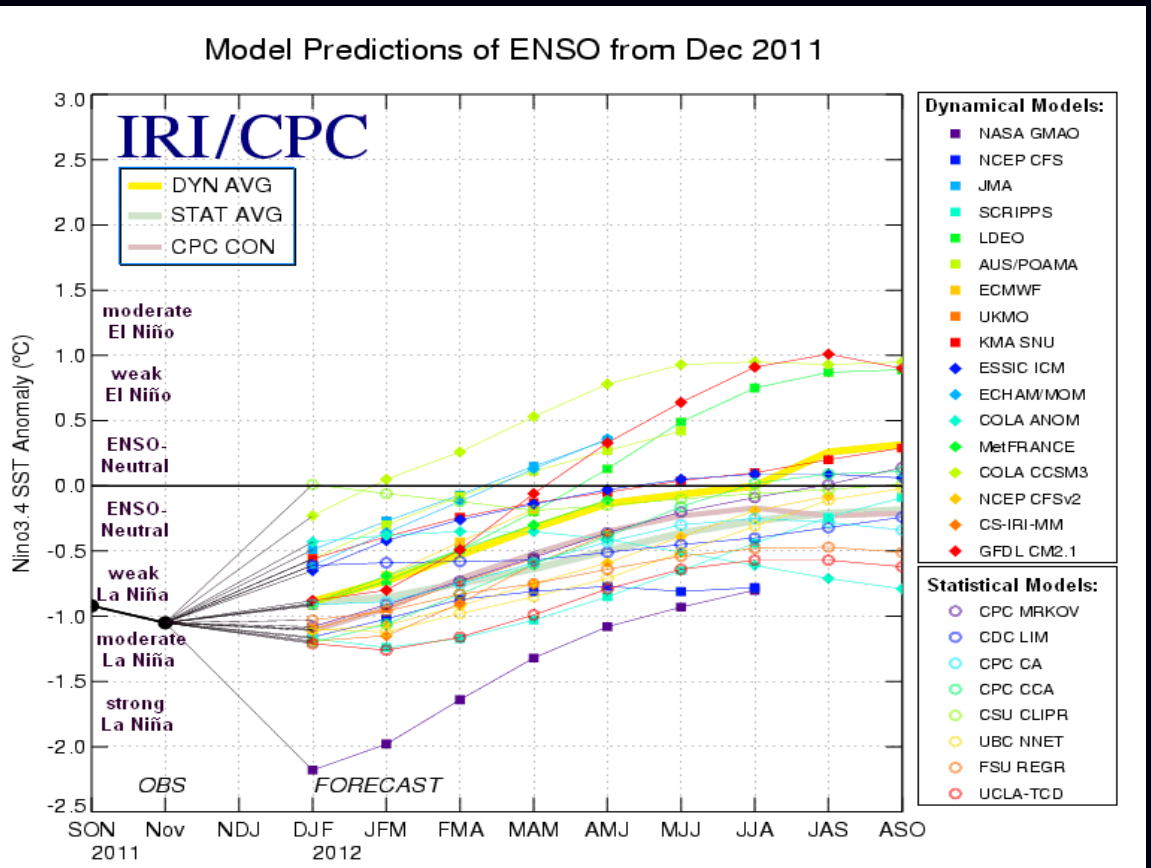
During the four week period 16 Nov to 07 Dec, 2011, SST remained below average within the tropical region (10□N-10□S Lat.) of the central and eastern Pacific Ocean. The red box denotes the Niño 3.4 region in the eastern tropical Pacific Ocean.)



During this 30 day period, local, rather than large-scale, changes in SST anomalies were observed across the eastern tropical Pacific Ocean.



As of 7 December, 2011 the weekly SST anomaly for Niño 3.4 was -1.0C. A year ago on this date, the SST anomaly for Nino 3.4 Region was -1.5C (see above.)



Forecast SST Anomalies (deg C) in the Niño 3.4 Region

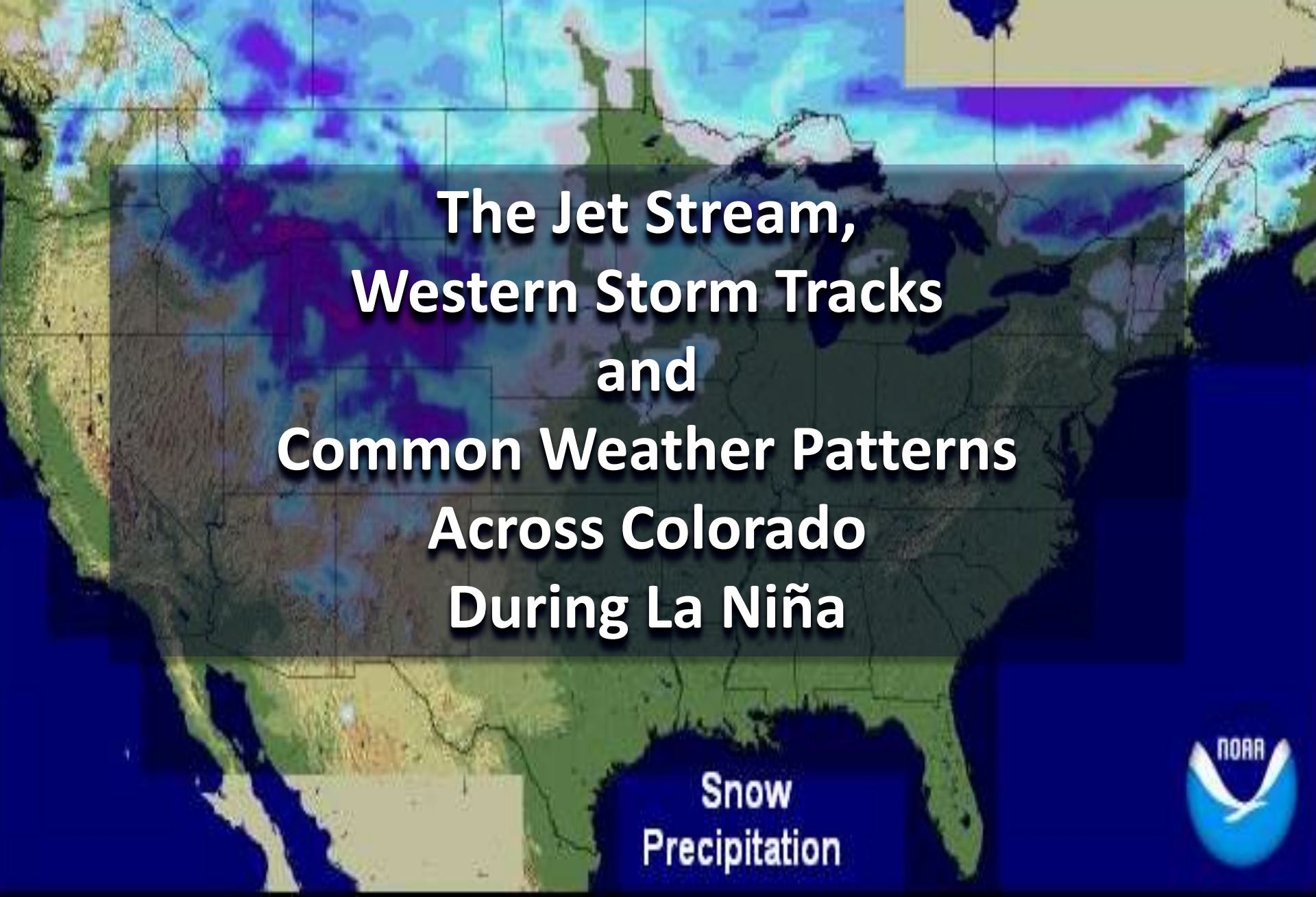
	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO
Average, dynamic models	- 0.9	- 0.7	- 0.5	- 0.3	- 0.1	- 0.1	0		
Average, statistical models	- 0.9	- 0.9	- 0.7	- 0.6	- 0.5	- 0.4	- 0.3	- 0.2	- 0.2
Average, for all models	- 0.9	- 0.8	- 0.6	- 0.4	- 0.3	- 0.2	- 0.1	0	0

Source: International Research Institute for Climate and Society (IRI) – updated Dec 15 2011

This past September (2011), La Niña conditions reappeared in the Pacific Ocean.

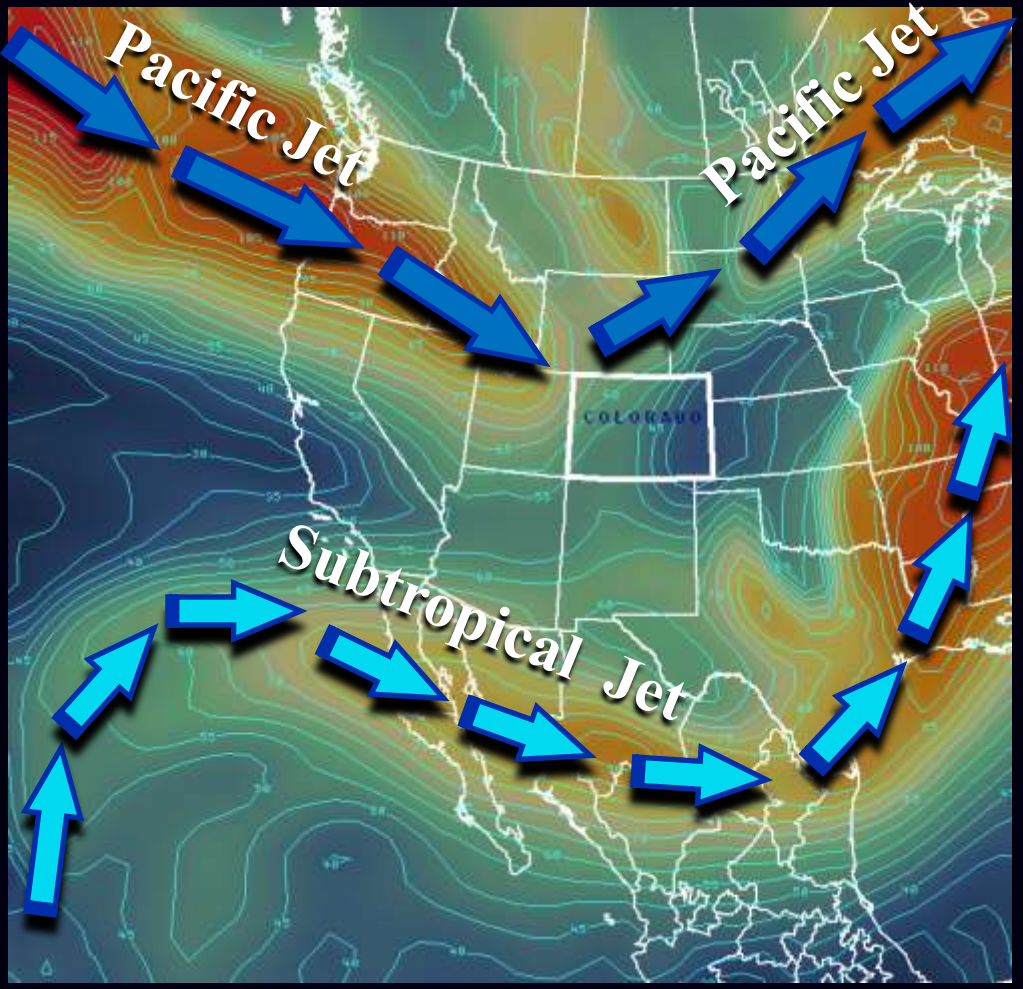
Approximately half of the dynamical and statistical ENSO models predict a weak La Niña, while the remaining models, including NCEP's Coupled System Forecast Model (CFS), predict a moderate La Niña through at least the Northern Hemisphere winter of 2011-2012.

NASA's Global Modeling and Assimilation Office (GMAO) model, went so far as to predict a strong La Niña this winter. However, current oceanic and atmospheric observational data does not support this model outlier.


The Jet Stream,
Western Storm Tracks
and
Common Weather Patterns
Across Colorado
During La Niña
Snow
Precipitation
NOAA

First…The Jet Stream

- A channel of strong winds within the Westerly Wind Belt (30-60˚ N latitude)
- Produced by large pressure and temperatures gradients between the poles and the Equator
- May be thousands of miles long, hundreds of miles wide, and thousands of feet deep
- Typically found between 20,000 and 35,000 feet ASL; sometimes lower in altitude during the winter months.
- Wind speeds may exceed 180 mph
- Its location can vary widely from week to week and even day to day.
- Much of the variability we see in precipitation, temperature, wind and cloud cover, particularly during the winter and spring, can be attributed to the Polar and Pacific jet streams.



Model Depiction of the Pacific and Subtropical Jet Streams

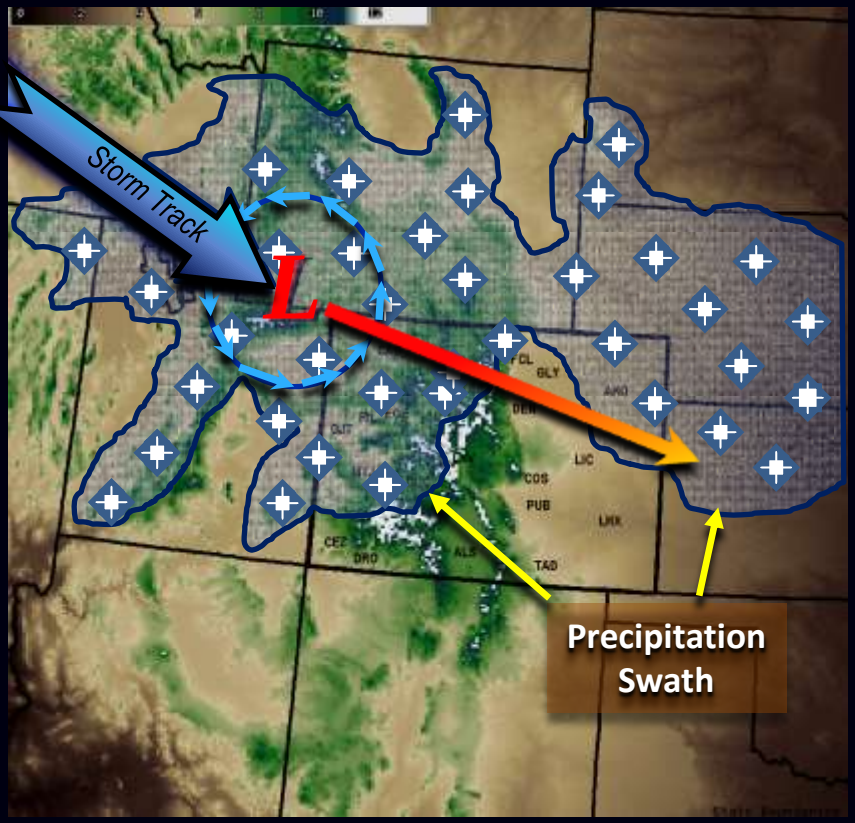
Typical Jet Stream Pattern During La Niñas

During La Niñas, particularly moderate to strong events, the Pacific jet stream is typically seen rounding the top of large upper level high pressure ridges along the west coast of the U.S. often for weeks at a time. The jet would then be seen tracking southeast over the central Rocky Mountain region along a path similar to the one depicted in the adjacent illustration.

Typical Jet Stream Pattern During El Niños

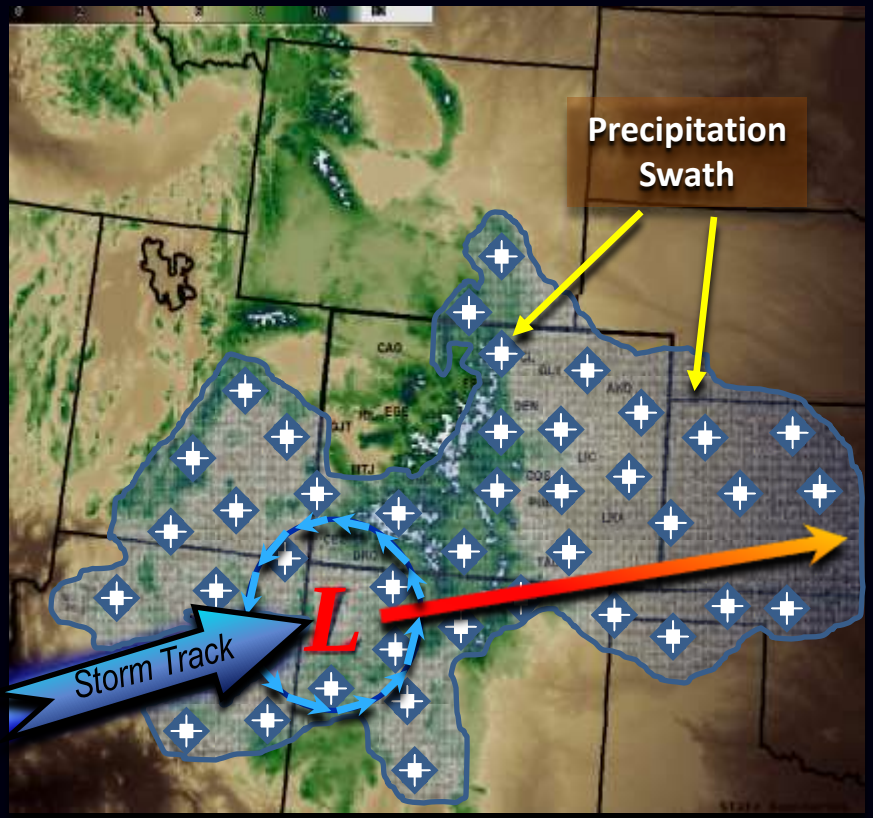
During El Niños, particularly moderate to strong events, the Pacific jet stream typically assumes a position farther south down the west coast where it can often be seen rounding the bottom of upper level low pressure troughs sitting over the southwest U.S. The jet would then normally meander eastward over the desert southwest and southern Rocky Mountain region along a path similar to the one depicted to the left.

Northwest Storm Track



Pacific storm systems following a path similar to the one depicted in the above illustration tend to produce much of their precipitation/snowfall over the mountainous terrain of northern Utah, western Wyoming and northwestern Colorado. These fast moving storms are usually accompanied of strong winds capable of creating blizzard-like conditions over the higher mountain elevations.

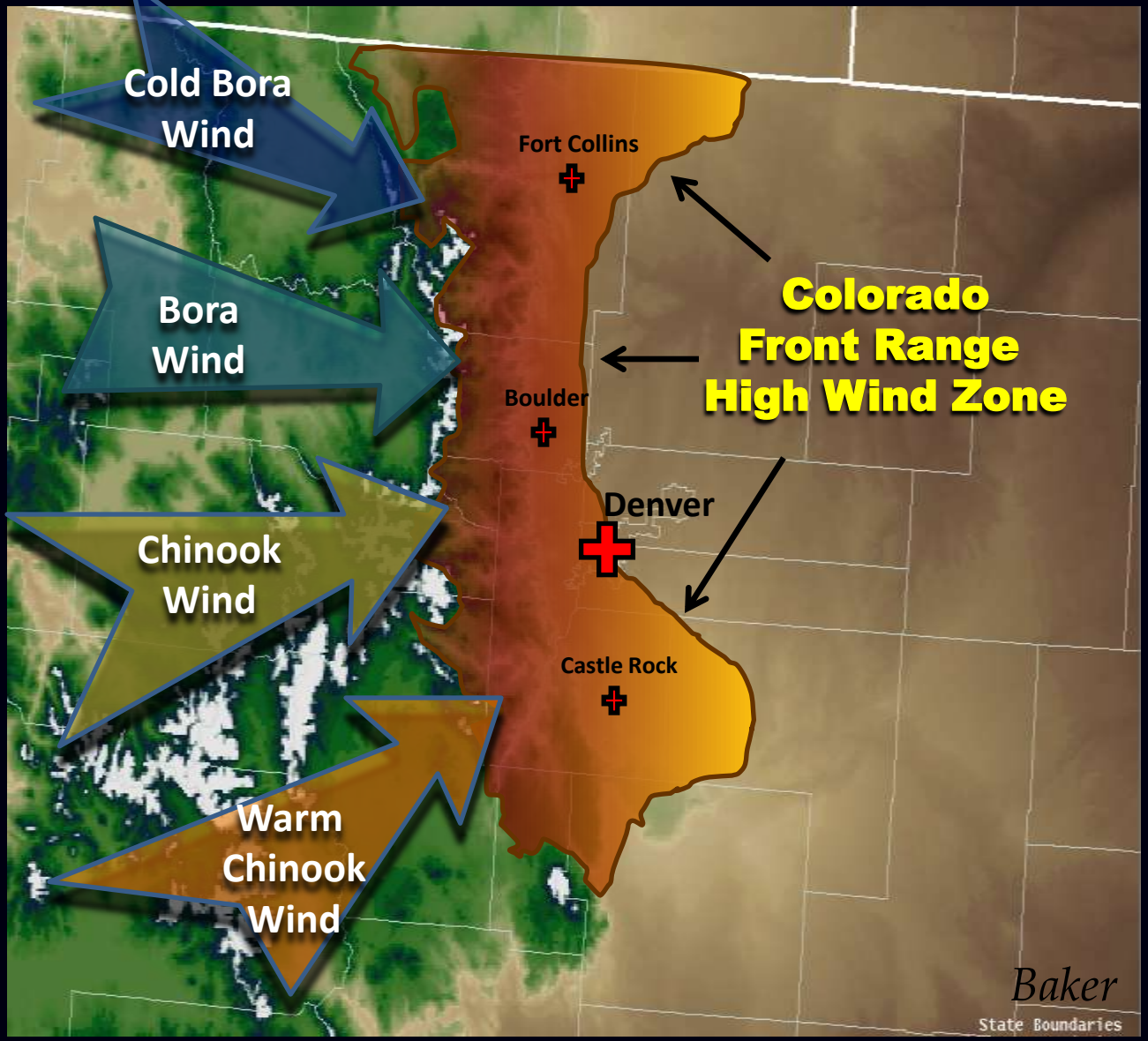
Southwest Storm Track



Storms tracking across the Four Corner region in a manner similar to that depicted above typically produce a precipitation/snowfall pattern similar to that shown above, with the heaviest precipitation over the mountains of northeast Arizona, northern and western New Mexico, southern Utah and southwest and south central Colorado. These storms are also capable of producing blizzard-like conditions on the high plains.

Baker - National Weather Service Boulder, Colorado

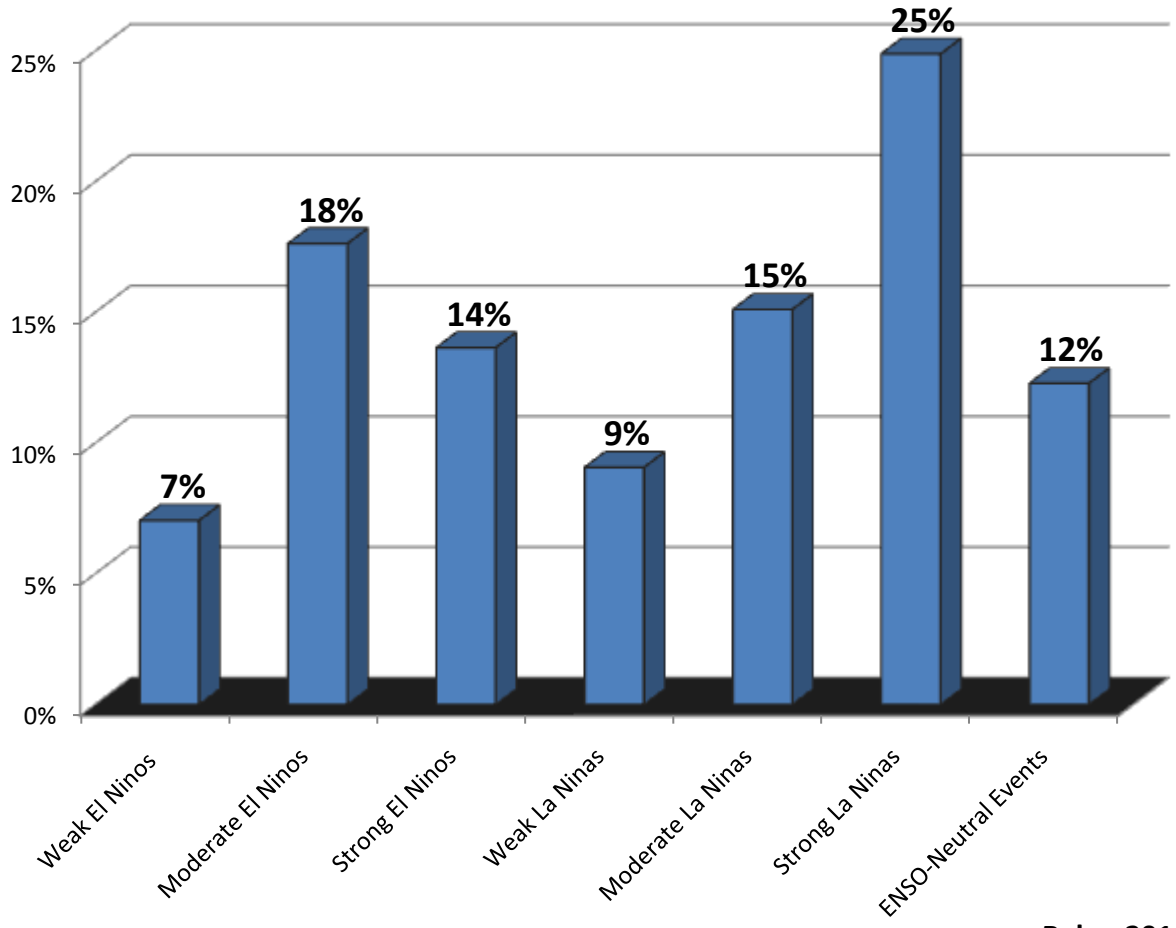
Gusty and potentially damaging downslope winds known by the names of **Chinook** and **Bora** are a common occurrence along the Colorado Front Range during the autumn, winter and spring.



The Chinook (a native American word meaning snow eater) is a warm and usually very dry downslope wind that forms on the leeside of the Front Range and mainly over central and southern sections with strong southwest flow aloft and a large difference in air pressure between western to eastern Colorado.

The Bora is a cold and often dry downslope wind that more often form over and along northern portions of the Front Range with the passage of a strong, fast moving Pacific cold front and in the presence of strong northwesterly flow aloft. The Bora wind is also more likely to be felt farther out on the plains of northeast Colorado.

Percentage of High Wind Days In the Boulder Area During ENSO and ENSO-Neutral Events, 1969-2010

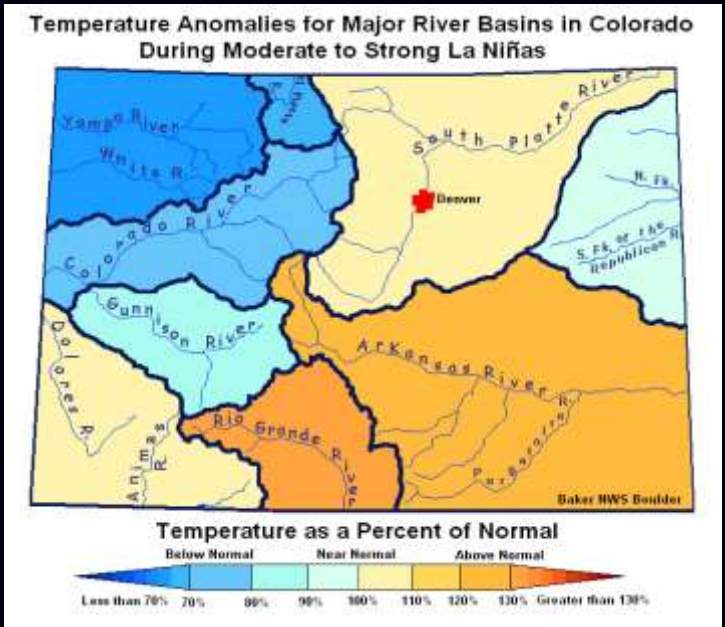


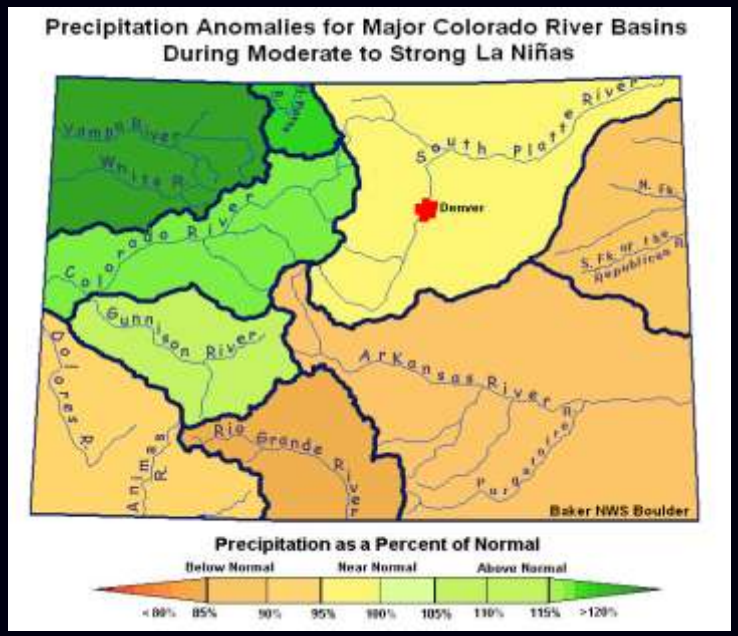
Baker 2011

High Wind Days – A day when the speed of a sustained wind or wind gust equals or exceeds 70 mph.

For Boulder, Colorado and the Front Range foothills and high plains adjacent to Boulder, high winds (both Chinook and Bora) historically have occurred most often during strong La Niñas (25 percent of all recorded occurrences) and moderate El Niño events (18 percent of the time), followed by moderate La Niña events (15 percent of the time).

High winds were observed least often during weak El Niño and weak La Niña events (7 percent and 9 percent, respectively.)



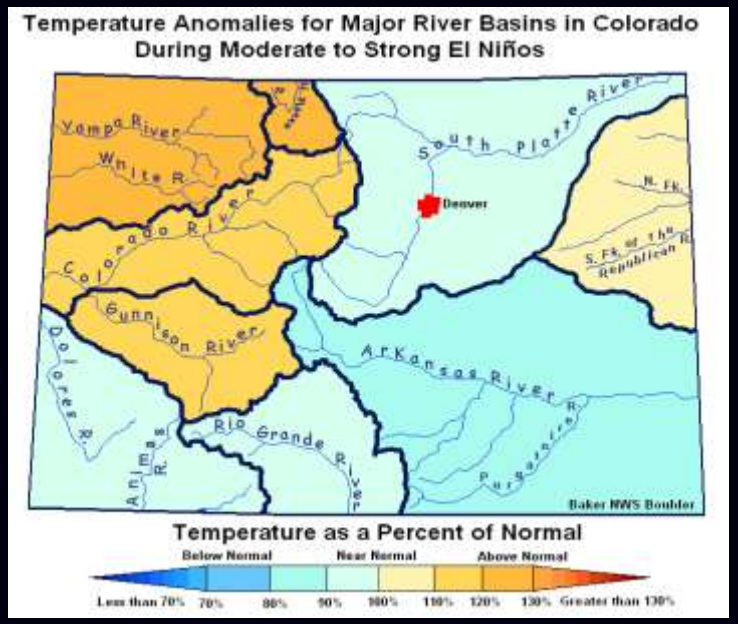


During La Niña Winters

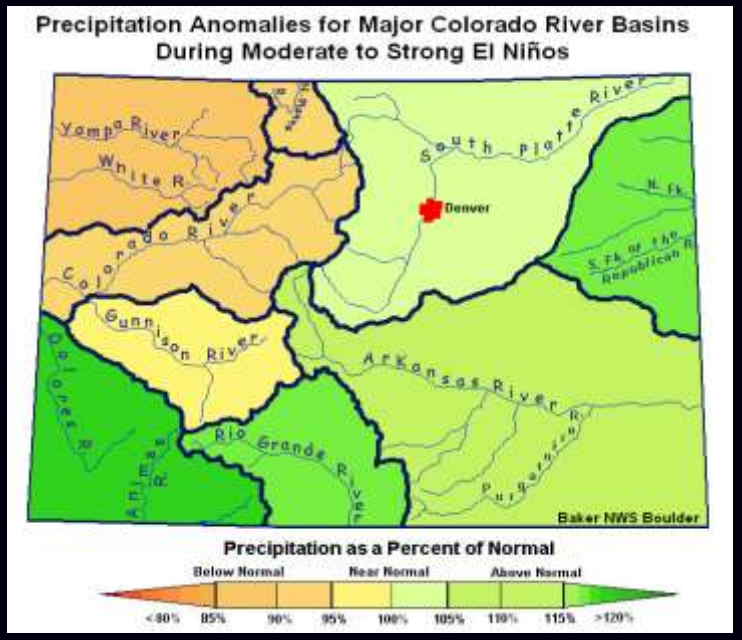
Temperatures – are typically below average across northwest, west central and north central Colorado and near to above average across southern and most of eastern Colorado during La Niñas of moderate to strong intensity. It is less likely to see this temperature anomaly pattern during weak La Niña events.

Precipitation/snowfall – is typically above to much above average across northwest, west central and north central Colorado, and below to much below average across southern and eastern portions of the state during La Niña events of moderate to strong intensity. This precipitation anomaly pattern is less likely to be present during weak La Niñas.

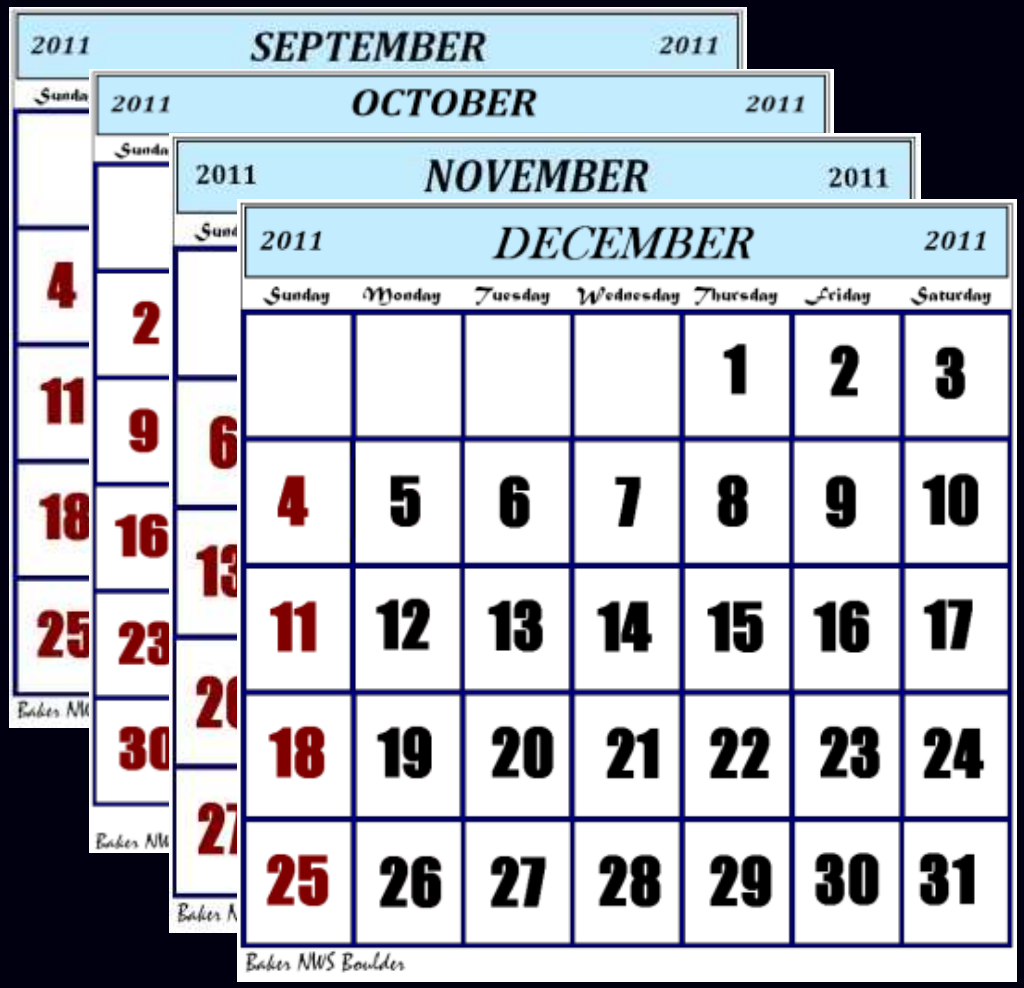
During El Niño Winters



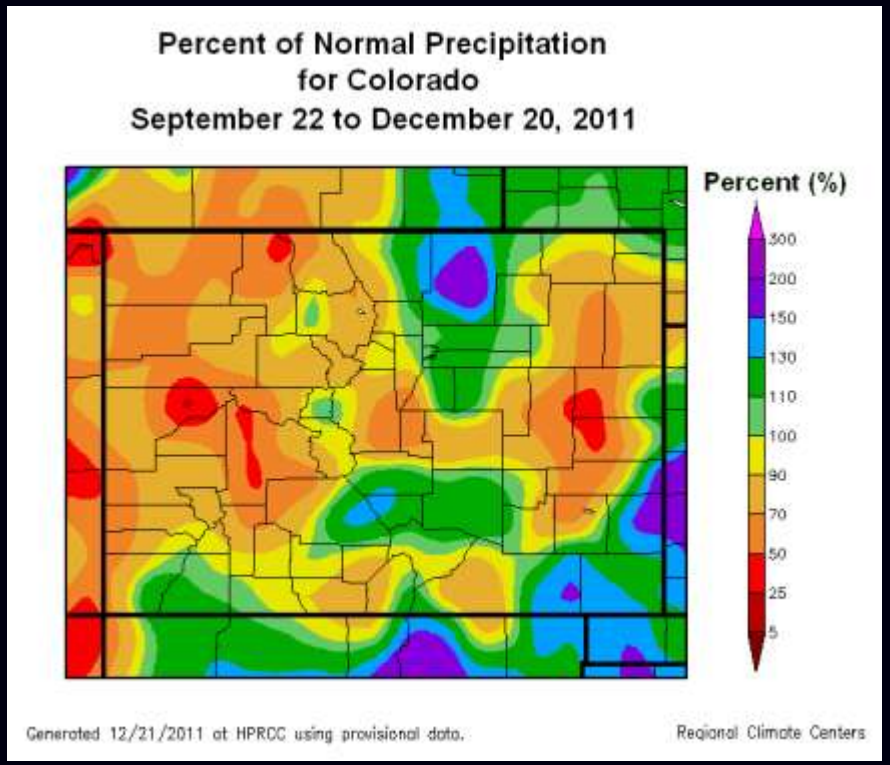
Temperatures – are normally above average across northwest, west central and north central Colorado and near to below average across southern and eastern Colorado during La Niñas of moderate to strong intensity. It is less likely to see this temperature anomaly pattern during weak El Niños.

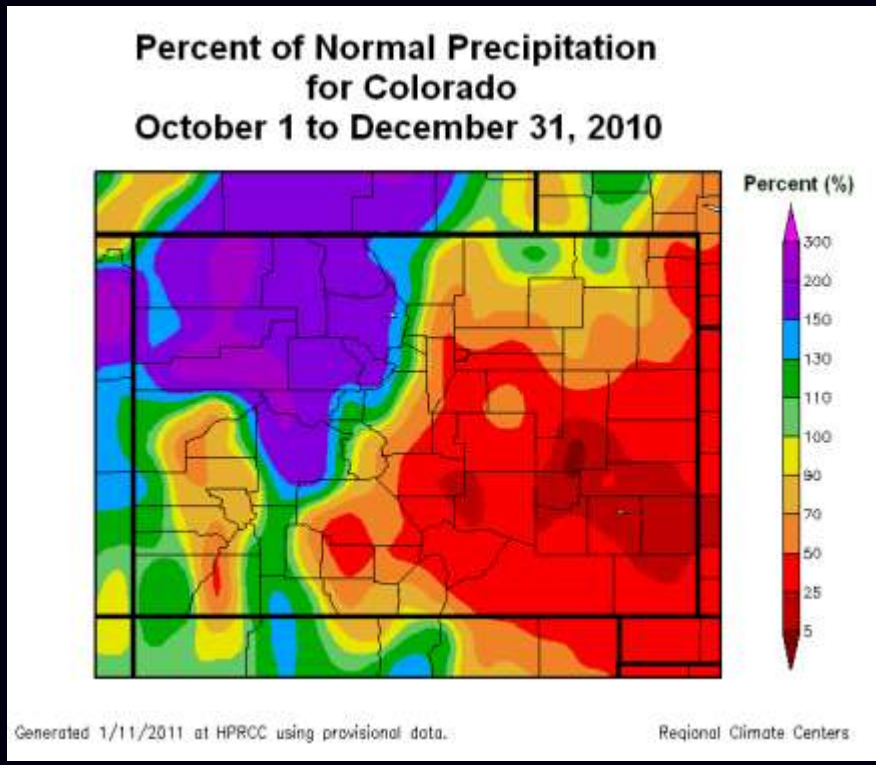


Precipitation/snowfall – is normally above to much above average across northwest, west central and north central Colorado, and below to much below average across southern and eastern Colorado during La Niña events of moderate to strong intensity. This precipitation anomaly pattern is less likely to be present during weak El Niños.



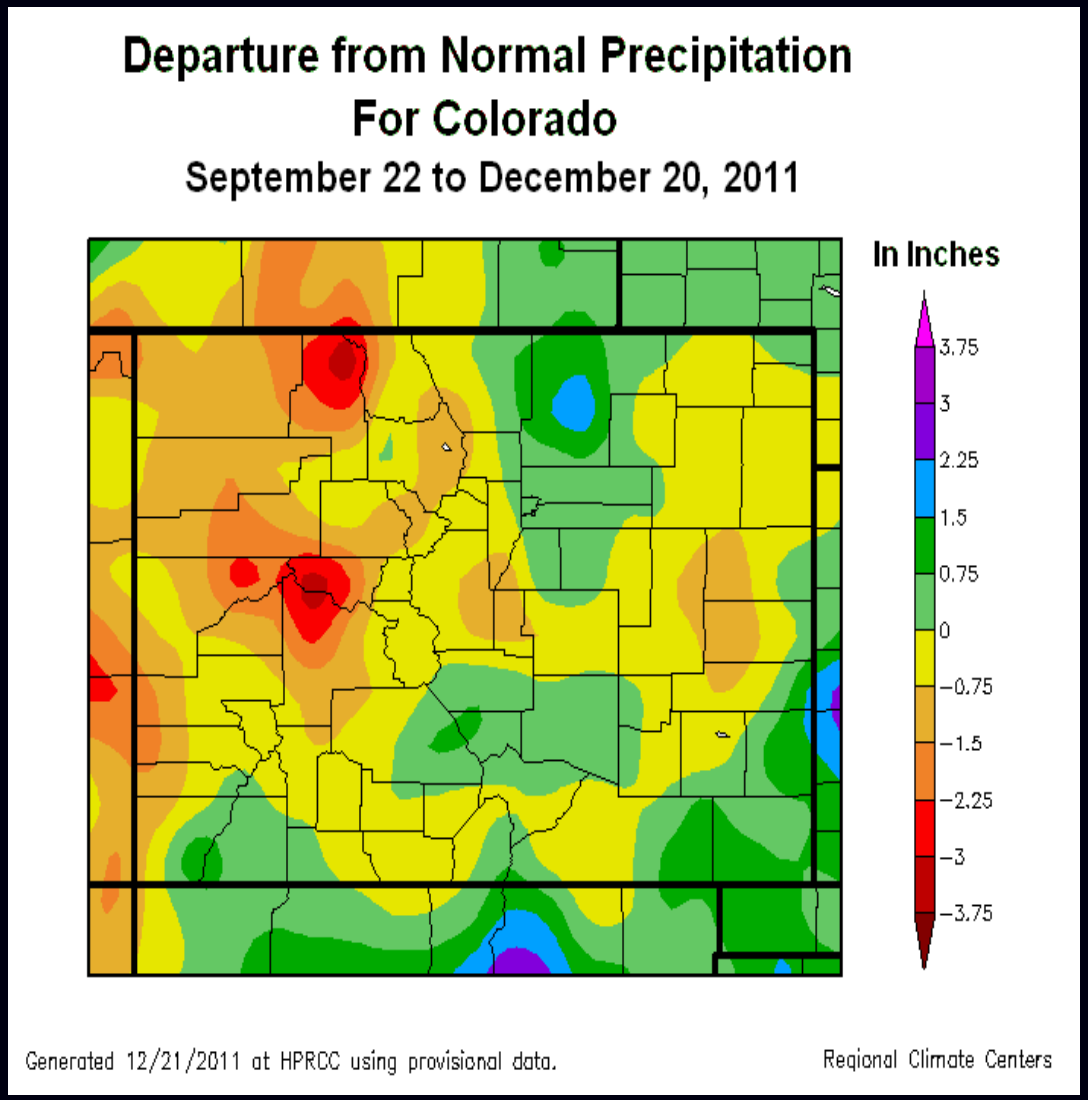
Temperature, Precipitation, and Drought Conditions Across Colorado During the 90-Day Period September 22 to December 20, 2011



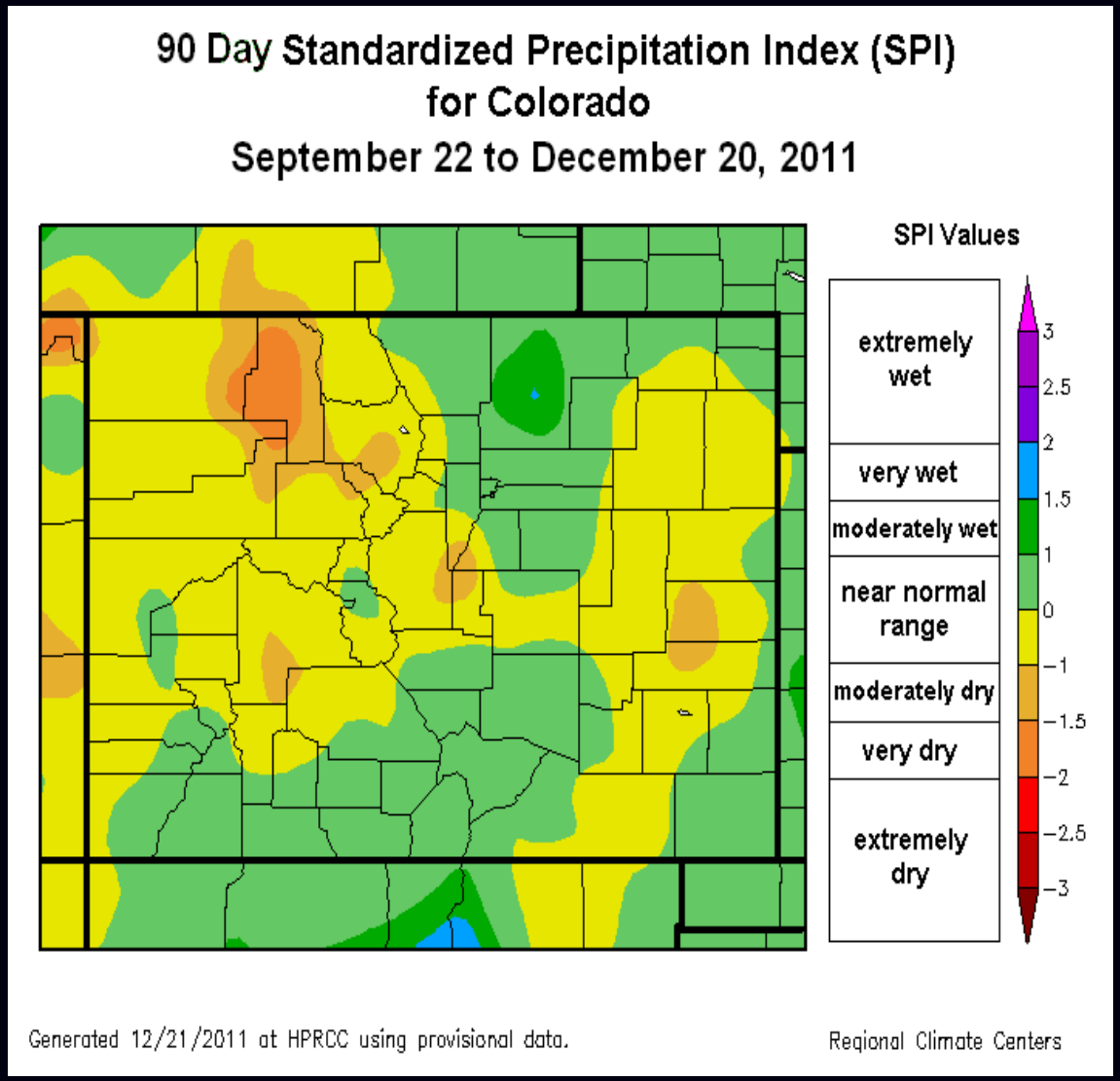


During the 90-day period ending December 20, 2011, precipitation totals across Colorado ranged from as little as 25 percent of normal for a number of locations in western Colorado, to as high as 200 percent of normal along the Front Range in northeast Colorado and in lower portions of the Arkansas River Valley near the Kansas border. Generally speaking, areas east of the Continental Divide were generally wetter/snowier than areas west of the Divide.

The distribution of precipitation this past autumn was in stark contrast to the precipitation distribution observed last autumn (refer to the map in the upper right.)



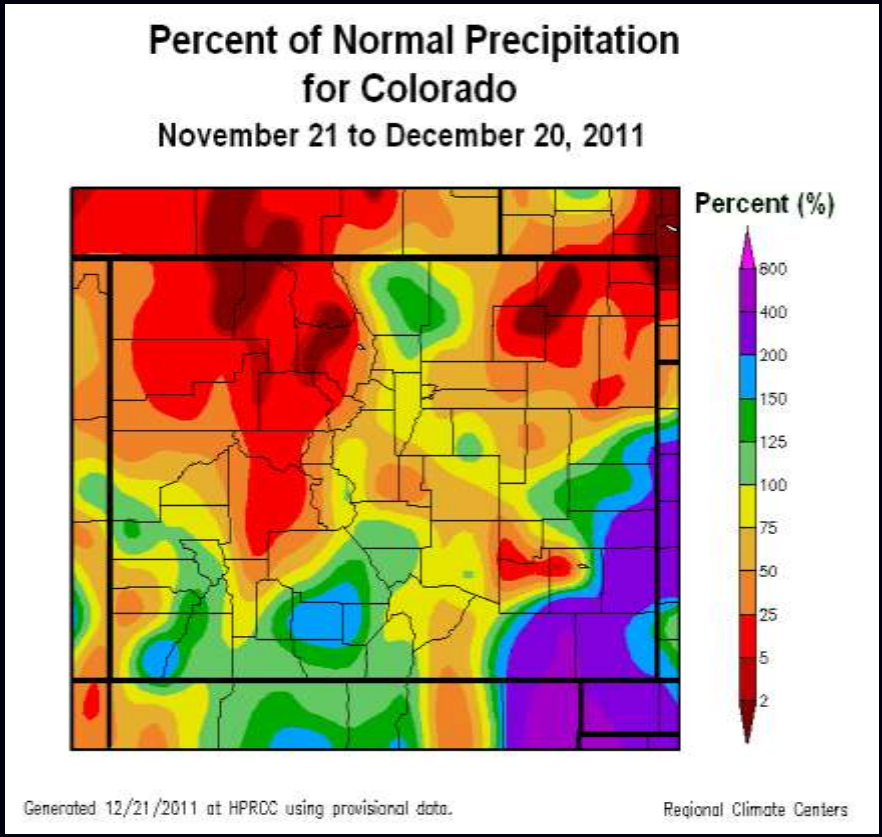
During this 90-day period, precipitation departures across Colorado ranged from around 4 inches below normal along the west facing slopes of the Park and Gore mountain ranges in north central Colorado and along the west facing slopes of the Elk and West Elk ranges in west central Colorado, to around 2 inches along the eastern slope of the Front Range in northeast Colorado. Once again, areas west of the Continental Divide were noticeably drier than areas east of the Divide, especially in those areas subject to frequent bouts of drying easterly downslope winds such as along the Gore and Elk ranges around Steamboat Springs and Aspen, respectively.

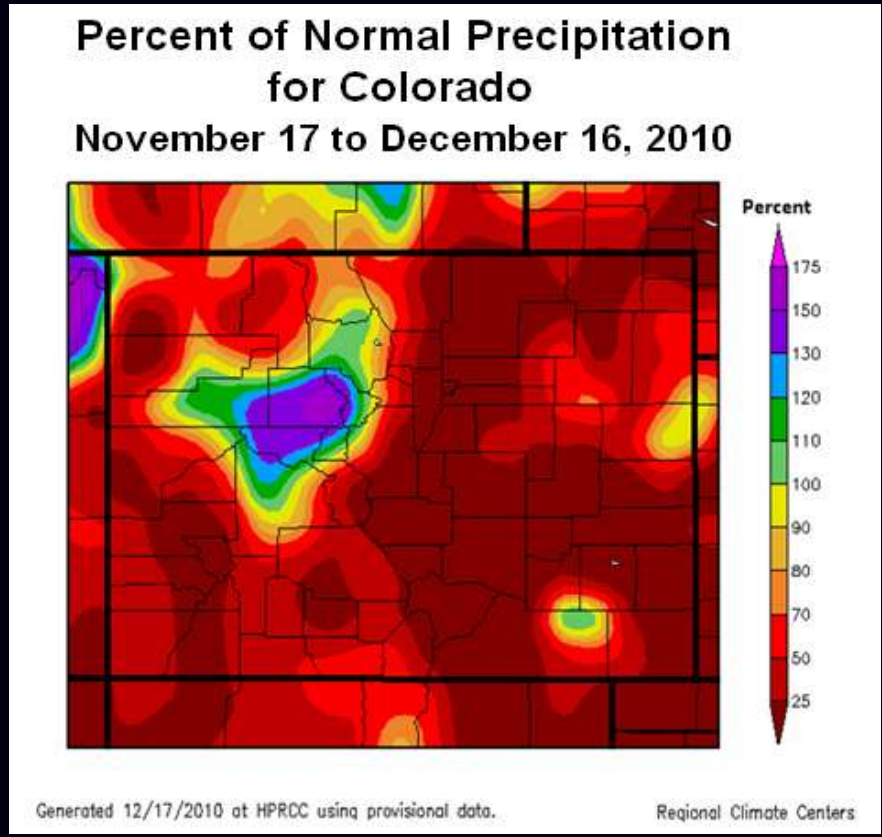


The Standardized Precipitation Index (SPI) for this 90-day period indicates near normal to very dry conditions across much of western Colorado, as well as portions of the state's southeast plains, and near normal to moderately wet conditions along the state's southern border and much of the eastern plains.

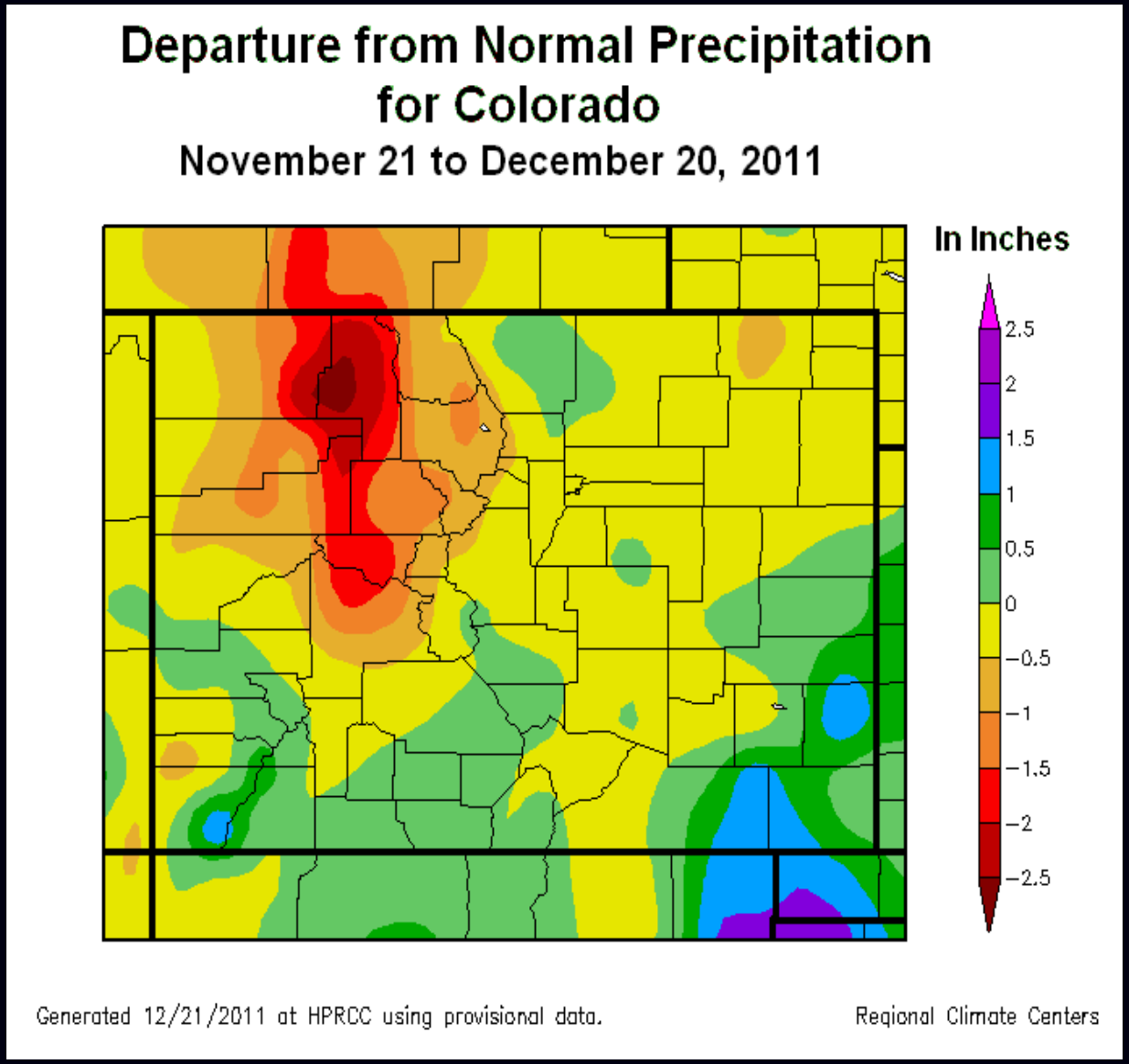
The SPI was developed to monitor potential short term agricultural and long-term hydrological drought conditions. The SPI is a probability index that considers only precipitation.

Temperature, Precipitation, and Drought Conditions Across Colorado During the 30-Day Period November 21 to December 20, 2011



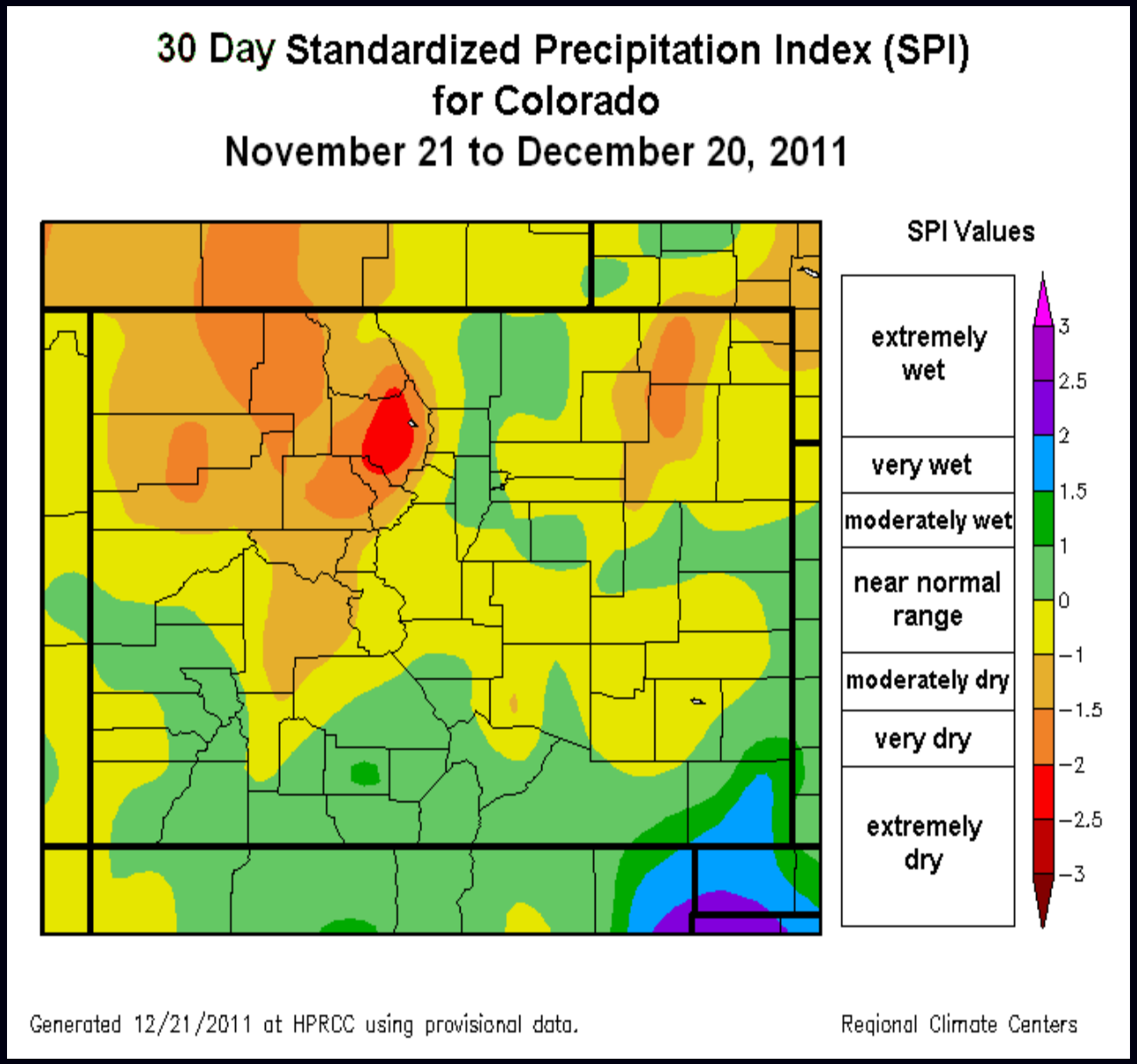


During the 30-day period ending 20 December, 2011, precipitation amounts across south central and southeast Colorado were well above normal; as much as 600 to 800 percent of normal in the southeast! This impressive statistic is largely due to a recent blizzard that deposited upwards of two feet of snow in the area. In contrast, much of northwest and parts of northeast Colorado saw significantly less precipitation; in parts of the northwest and north central mountain valleys as little as 5 percent of normal! Again, this was a dramatic reversal from the pattern observed one year ago when a strong and persistent northwest flow ushered in waves of heavy snow and strong winds to northwest Colorado, and produced frequent bouts of abnormally warm and very dry downslope winds east of the mountains. (Note this obvious difference in last year's precipitation on the map in the upper right.)



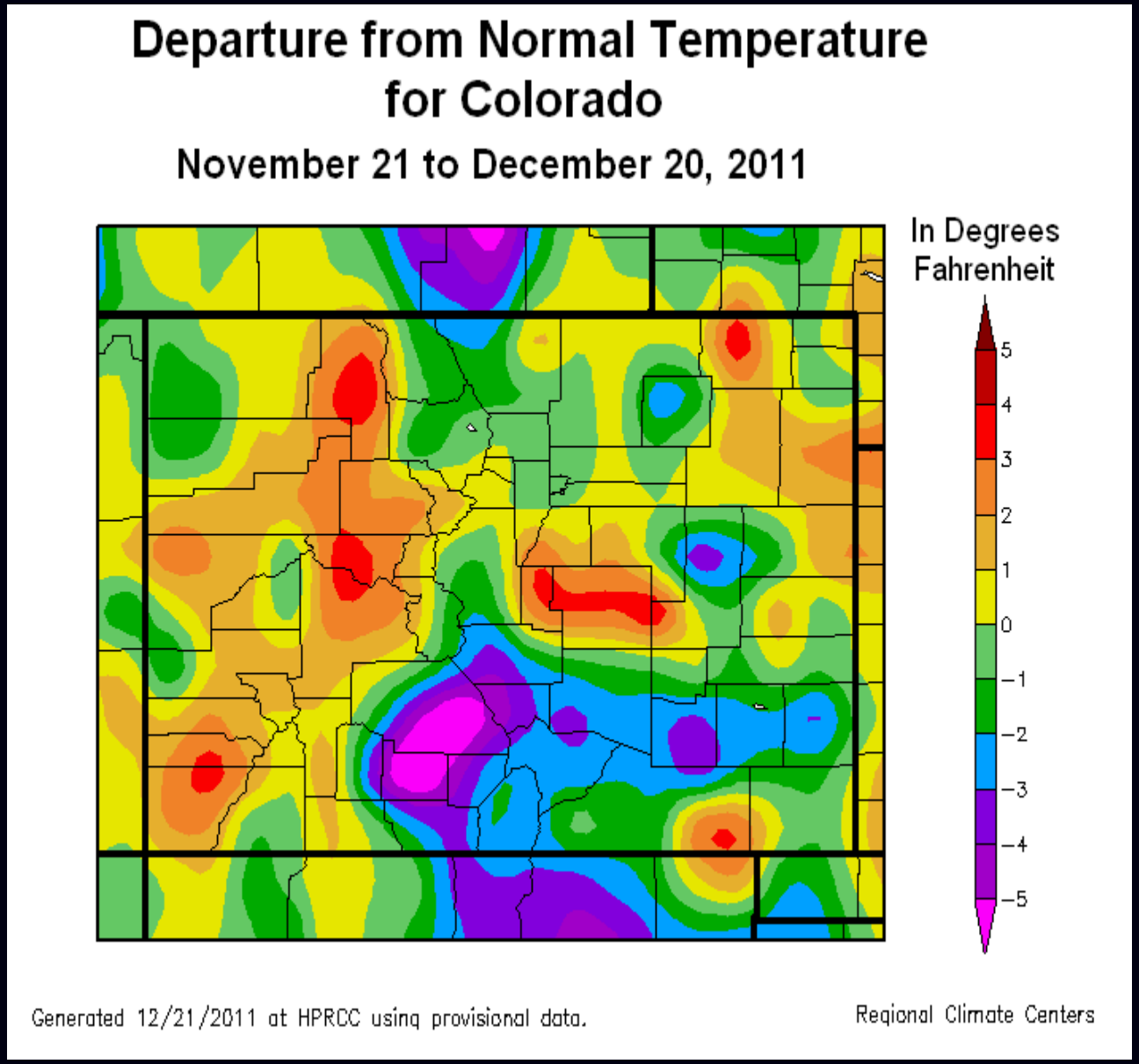
During the 30-day period ending December 20, 2011, precipitation departures across Colorado varied widely from near 1.5 inches in southeast Colorado and southern slopes of the San Juan Mountains in southwest Colorado, to an impressive 2 to 3 inches below normal in northwest and west central Colorado, generally along the western exposures of the Gore, Park, Elk and Wet Elk mountain ranges.

A significant shift in the large scale wind pattern and storm track set the stage for this dramatic reversal in precipitation across Colorado. A persistent storm track across New Mexico and southern Colorado kept precipitation largely confined to these areas.



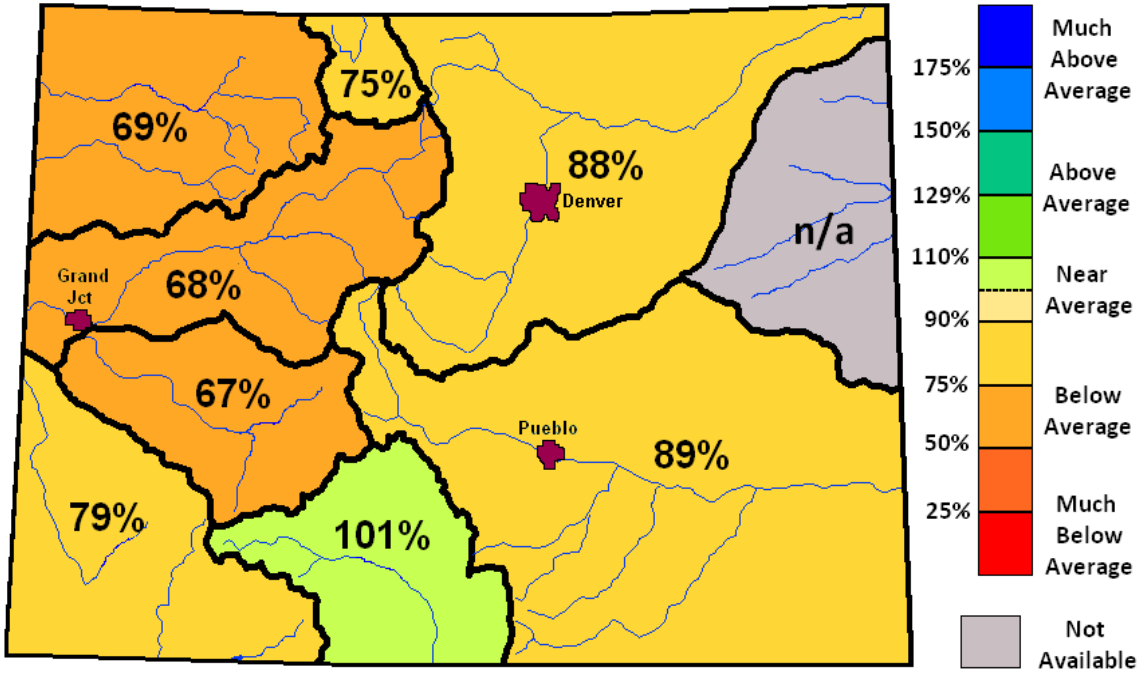
Moisture levels across Colorado during this 30-day period, according to the SPI, were near normal to moderately dry across northern Colorado, and near normal to very wet across the southern half of the state.

Most notable was the bulls eye of extremely dry conditions in the upper portions of the Colorado River Basin, particularly in Grand County, where soil conditions were determined to be extremely dry.



Temperatures across Colorado during the 30-day period ending December 20, 2011, varied widely across the state. Temperatures ranged from 3 to 5□F below normal in parts of the south and southeast, to around 3□F above normal in east central Colorado around Colorado Springs and portions of the northwest and west central Colorado. The lack of precipitation and snow cover in this region no doubt had a significant influence on temperatures.

Colorado SNOTEL Snowpack Update Map



Snow Water Equivalent as a Percent of Average (%)
for Colorado by River Basin as of Thursday December 22, 2011

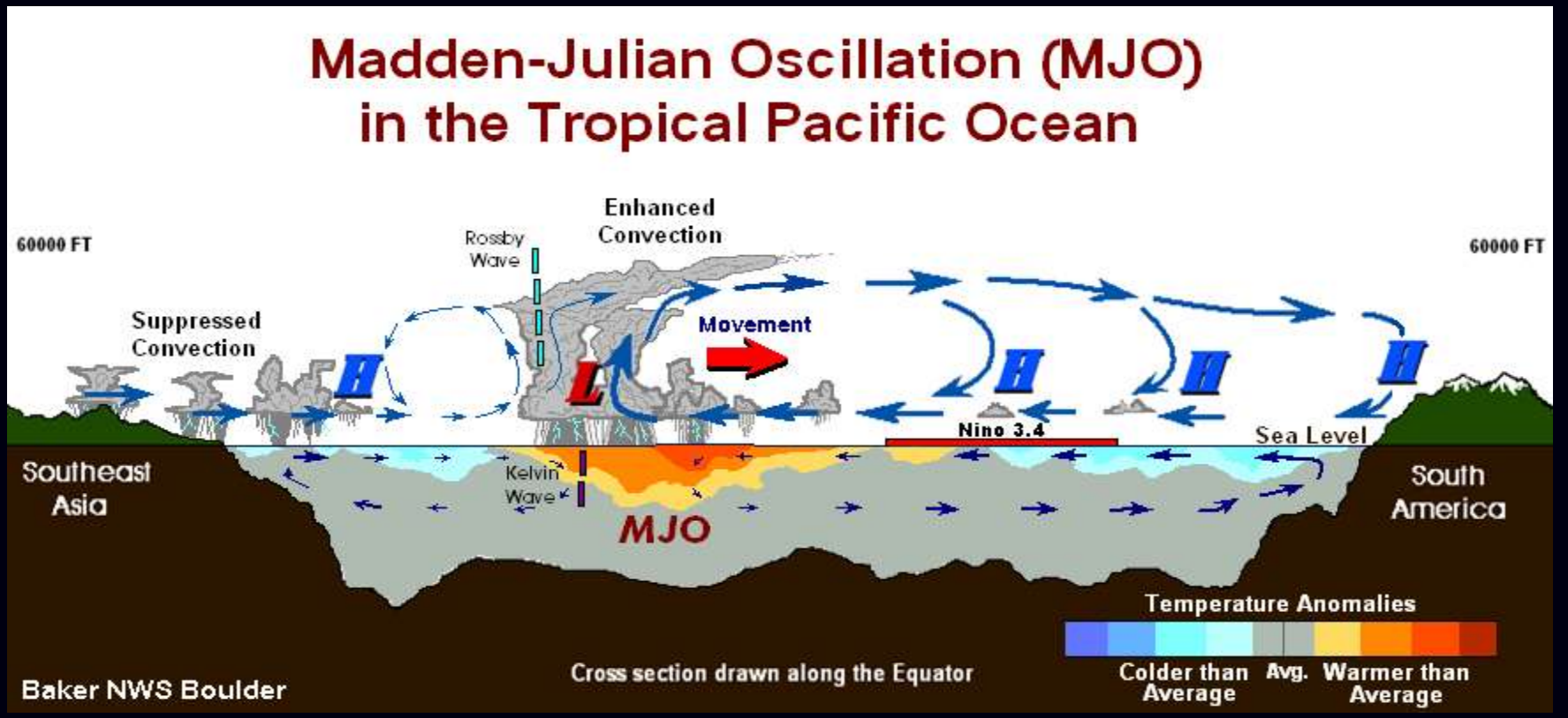
Basin Wide Percent of Average (%)

WEST SLOPE		EAST SLOPE	
Yampa and White River Basins	69%	Laramie & North Platte Basin	75%
Upper Colorado River Basin	68%	South Platte River Basin	88%
Gunnison River Basin	67%	Arkansas River Basin	89%
San Miguel, Dolores, Animas & San Juan River Basins	79%	Statewide Avg....	77%
Upper Rio Grande Basin	101%		

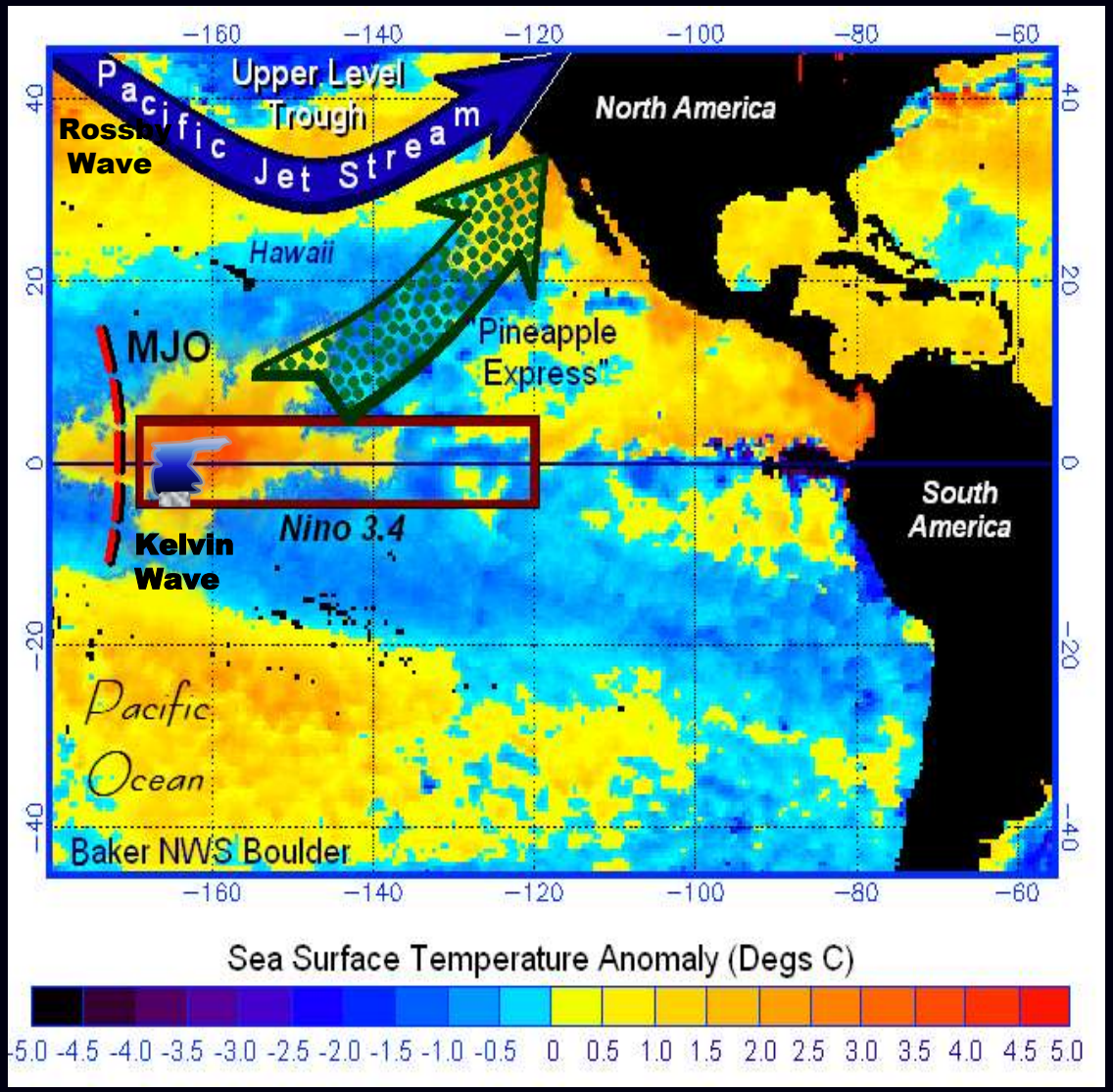
Source: USDA Natural Resources Conservation Service--Water and Climate, Portland, Oregon
provisional data, subject to revision

Snowpack in Colorado as of December 22, 2011 was below average for all except the San Luis Valley in south central Colorado where the latest snowpack measurement was about average.

The predominant storm track during the past several weeks favored precipitation/ snowfall production across southern and eastern portions of the state—a pattern commonly observed during El Niño events. This unexpected shift in the storm track and jet stream is believed to have been influenced by a couple **MJOs** moving across the Pacific Ocean.

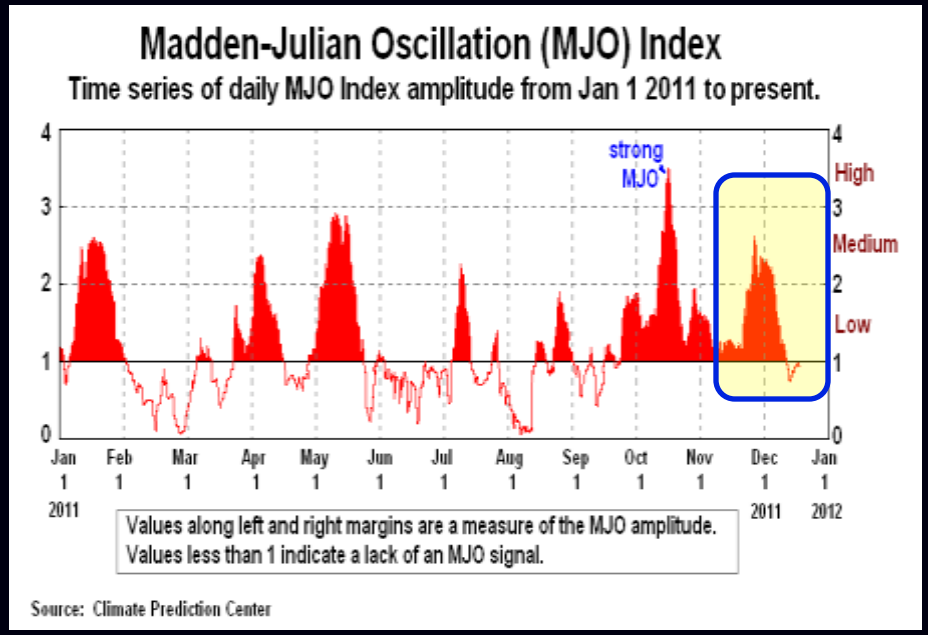


Interseasonal variations in wind and temperature produced by the 30-60 Day Tropical Wave, also known as the Madden-Julian Oscillation (MJO), can have a significant influence on global atmospheric and oceanic circulations. MJOs (tropical oceanic Kelvin waves) can circle the globe along the Equator normally within 30 to 60 days or about 45 days on average. MJO activity in the Pacific is most often greatest during weak La Niñas and ENSO-neutral conditions, and weakest or absent during moderate to strong El Niño episodes. MJO circulations propagating across eastern tropical Pacific Ocean can have a significant impact on weather patterns from Hawaii to the western continental United States. These impacts include large scale variations in temperature, wind and precipitation similar to those observed during moderate to strong El Niños, but with much shorter duration.

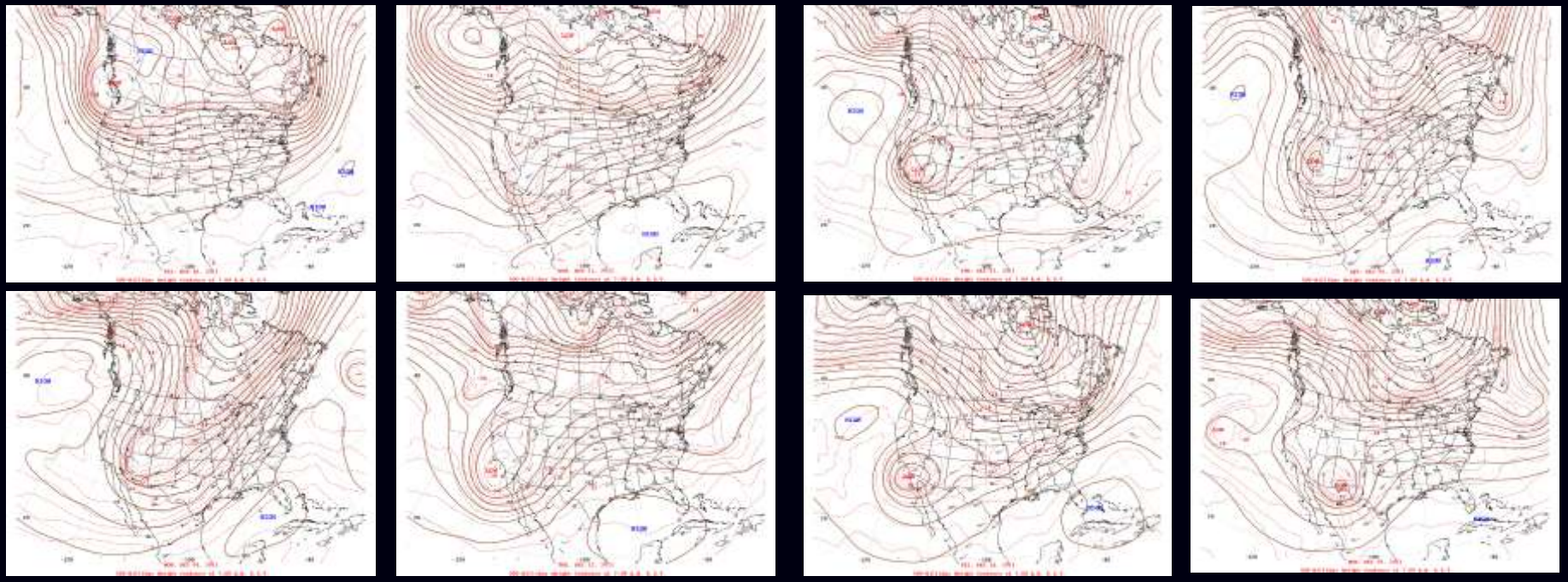


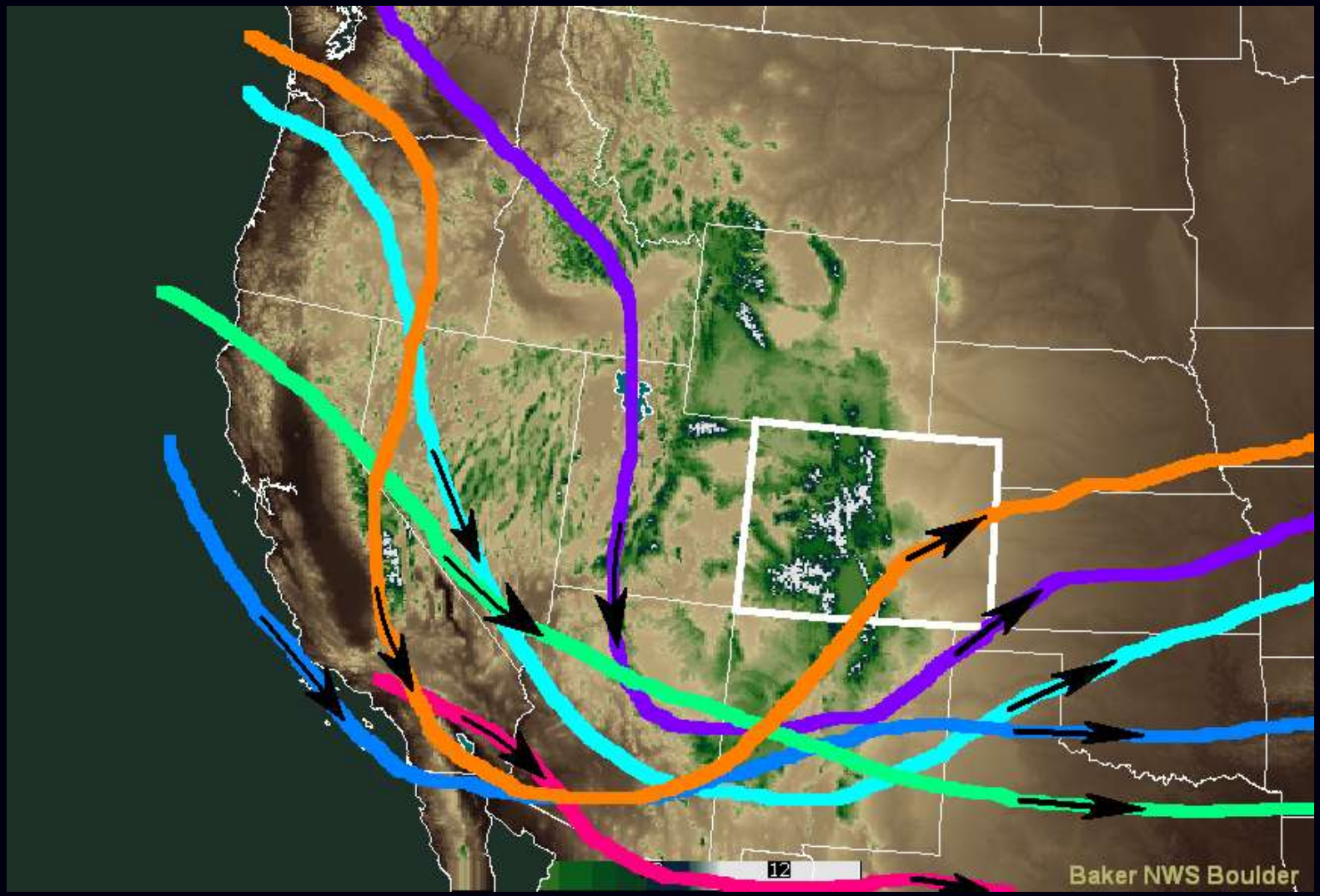
Deep tropical convection or thunder-storm activity along the Intertropical Convergence Zone (ITCZ) is enhanced by the anomalous warming of sea waters by means of subduction in advance of these eastward propagating MJOs or oceanic tropical waves.

As the Kelvin wave and its deep convection traveled eastward through the Niño 3.4 region in the eastern Pacific, broad circulation around the south side of the Rossby wave or upper level mid-latitude trough helps to transport a steady stream of moisture rich tropical air northeastward up into middle latitudes via the subtropical jet stream ("Pineapple Express"). The effects of this tropical connection are normally first felt in Hawaii, then across the western U.S. as the MJO continues its eastward progress through the Niño 3.4 region. Common effects include abnormally heavy precipitation, greater cloud cover and warmer nighttime temperatures.



The Madden-Julian Oscillation Index peaked once again in late November and early December of 2011. During this five week period, several upper level mid-latitude troughs (Rossby waves) formed or passes over the western U.S., and in many instances remained over this region for several days at a time. This large scale upper air pattern often resulted in periods of moderate to heavy precipitation/snowfall across the southwest U.S. including southern and eastern Colorado; conditions more often seen during El Niño cycles.





A majority of the storm systems that forms over and/or propagated across the western continental U.S. during November and December followed paths that took them south of Colorado. This southern storm track pattern is believed to be largely responsible for the abnormally light precipitation/snowfall observed across west central and northwest Colorado during this two month period.


Historical
Temperature and Precipitation
Trends
for Colorado
During El Niños, La Niñas
and ENSO-Neutral
Conditions

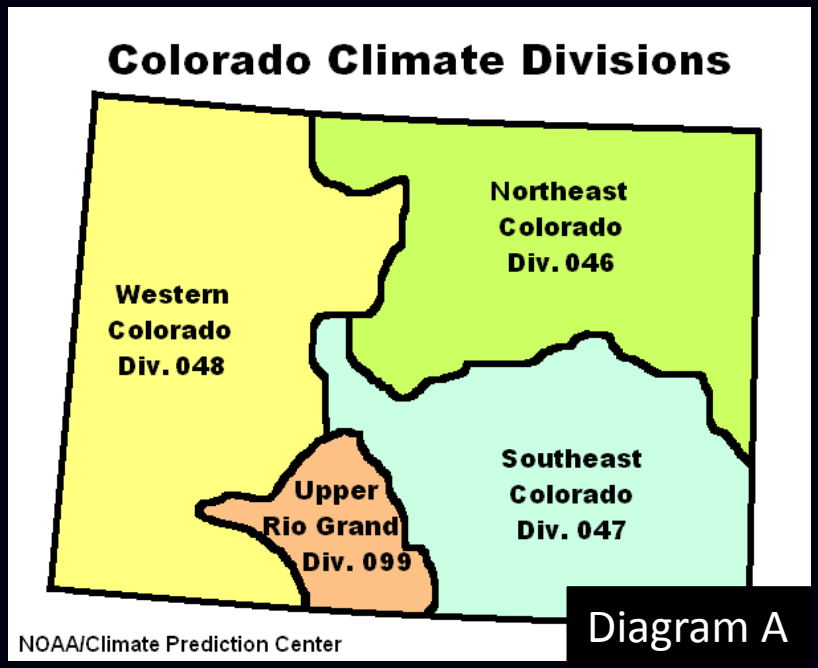


Diagram A

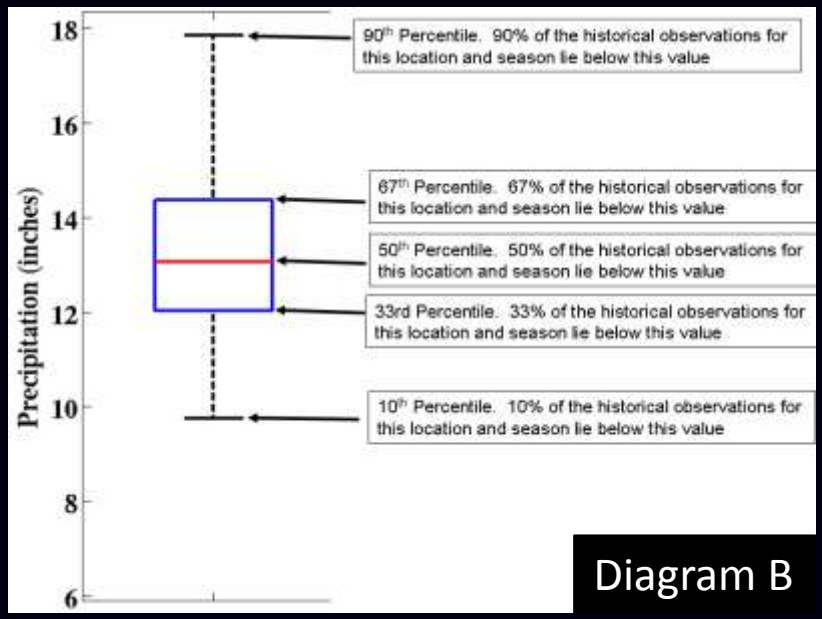


Diagram B

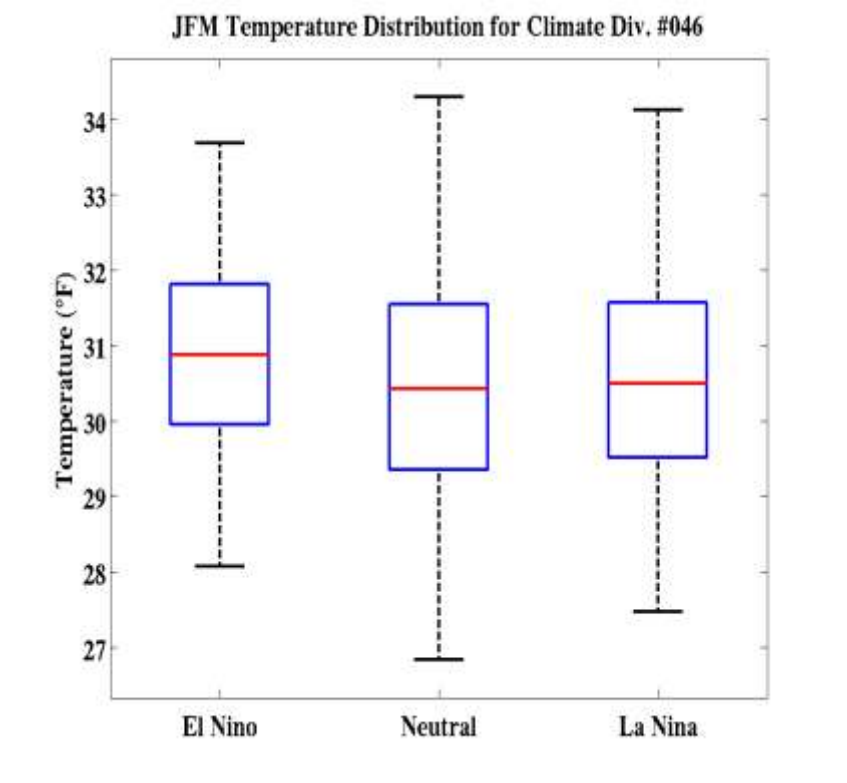
Diagram A depicts the four CPC climate mega-divisions in Colorado. Climate divisions 046, 047 and 099 are located on the east side of the Continental Divide, while division 048 is situated on the state's western slope.

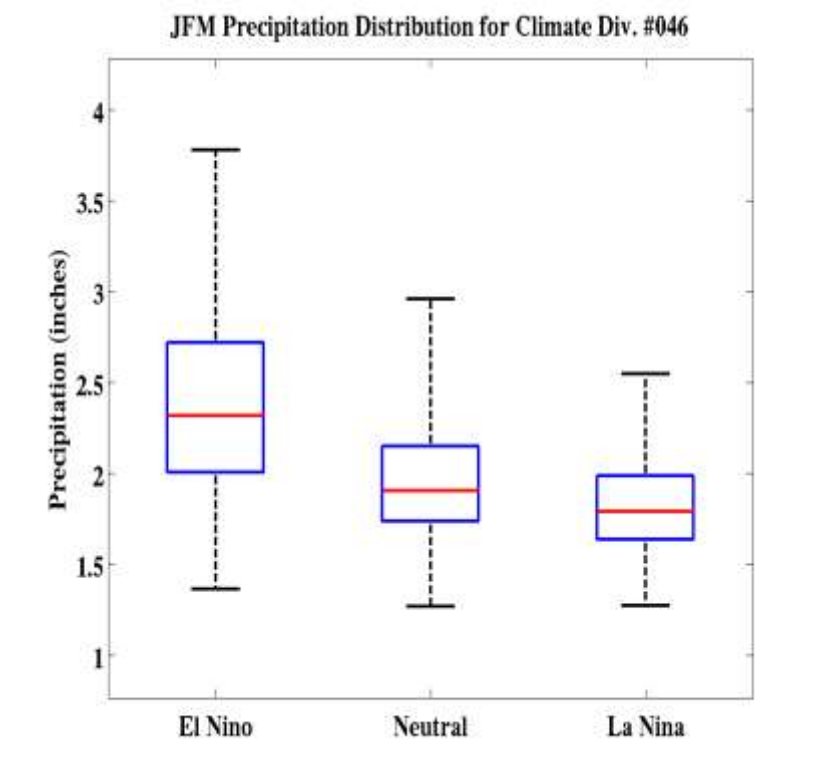
CPC has produced historical 3-month temperature and precipitation distributions associated with three different ENSO categories –El Niño, La Niña and neutral (non-ENSO) conditions – for each climate division in the United States.

Diagram B depicts and describes the ENSO box and whisker analysis plots used by CPC to present these historical temperature and precipitation distributions.

The red line inside the ENSO box represents the mean or 50th percentile of the data (temperature or precipitation) distribution for each climate division. Approximately 34% of the total observations exist within the ENSO box, and the remaining observations (about 66%) lie outside of the box along the whiskers extending above and below the box.

ENSO Box and Whisker Analysis Plots for the Northeast Colorado Climate Division #046 for the 3-Month Season January-March

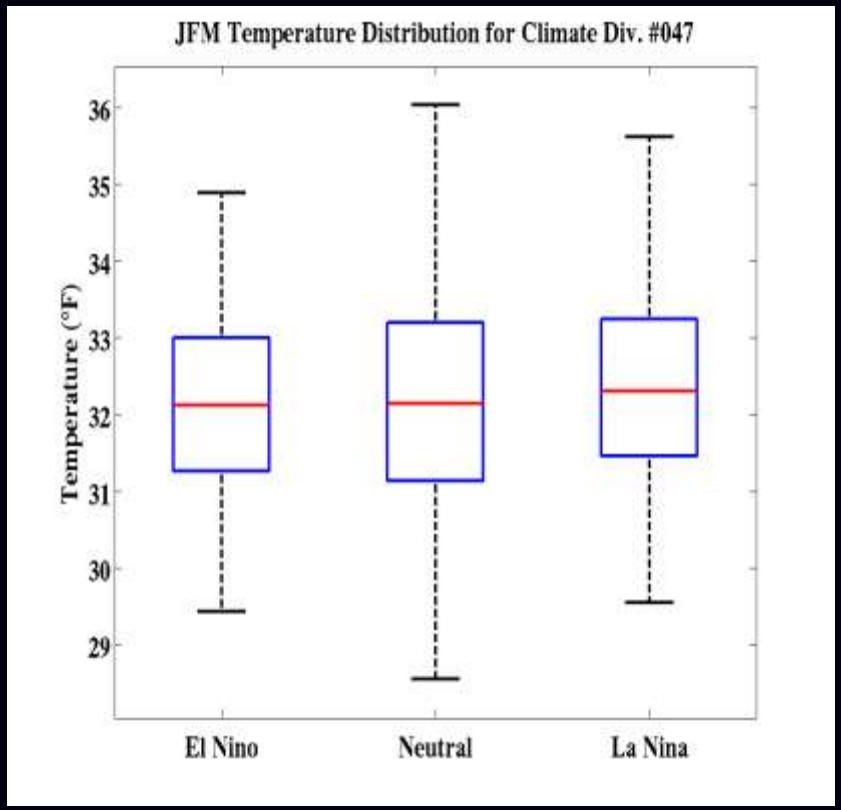




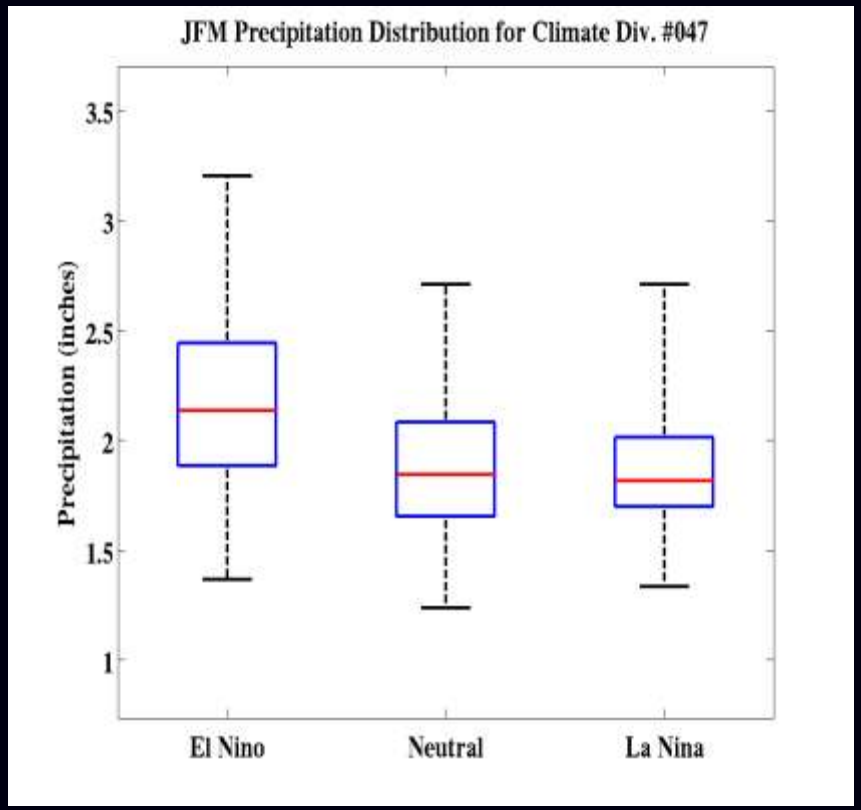
Historically, temperatures for northeast Colorado during the months of January-February-March were found to be similar during La Niña and non-ENSO periods, and only slightly warmer during El Niño events.

Precipitation for northeast Colorado during this three month period was greatest during El Niño events and least during La Niñas, with ENSO-neutral periods only slightly greater.

ENSO Box and Whisker Analysis Plots for the Southeast Colorado Climate Division #047 for the 3-Month Season of January-March

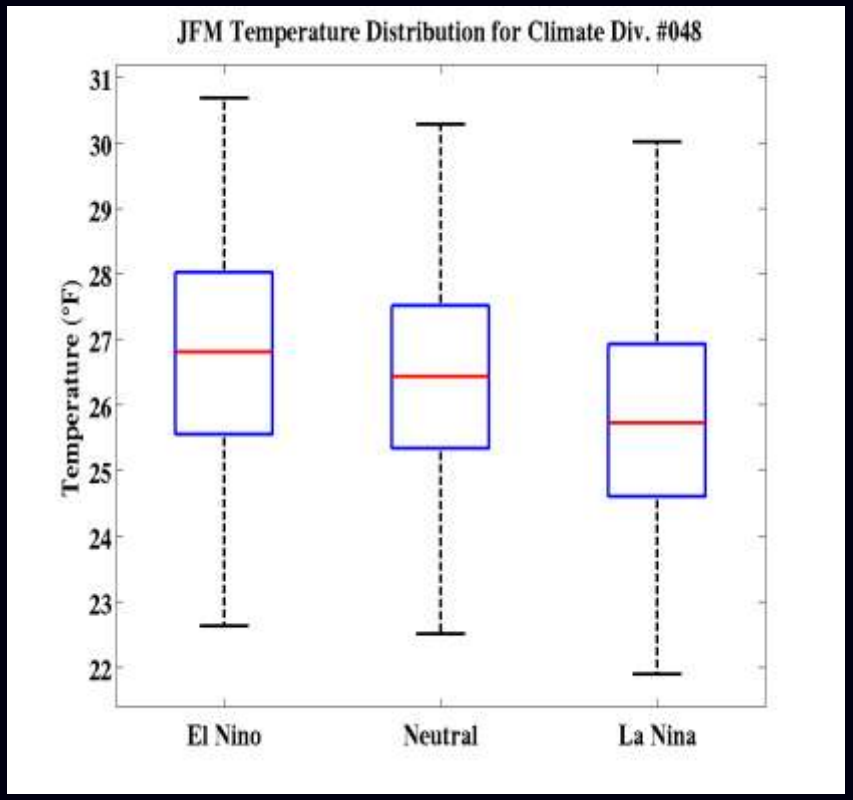


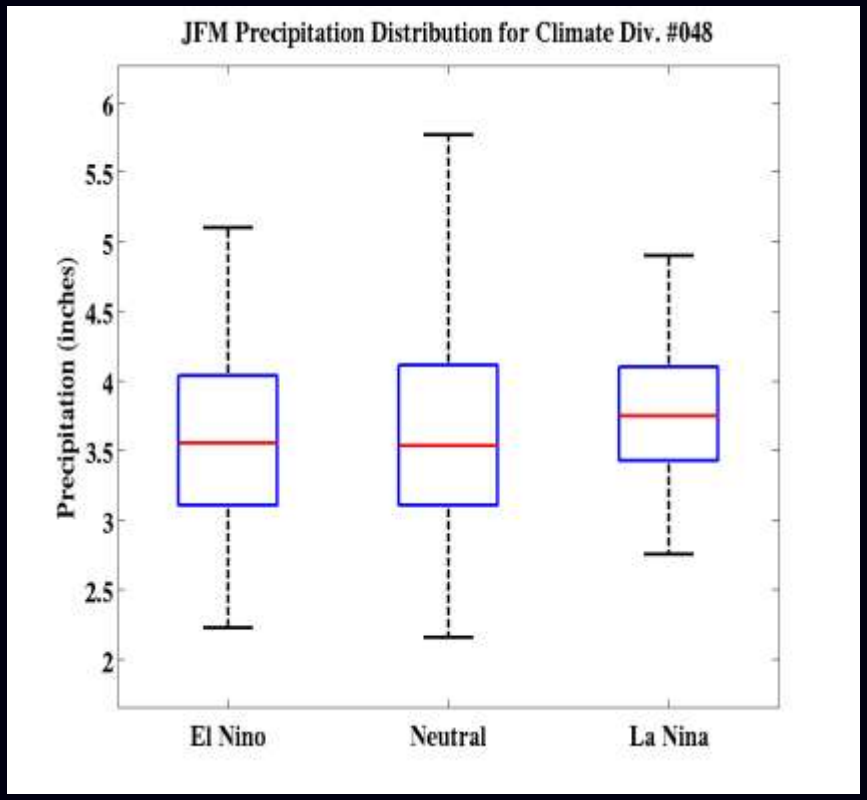
Temperatures for southeast Colorado during January-February-March were nearly similar for ENSO and ENSO-neutral periods, with a slight bias towards warmer temperatures during La Niña events.



Precipitation for southeast Colorado for the same three month period was greatest during El Niño events and about the same during ENSO-neutral and La Niña events.

ENSO Box and Whisker Analysis Plots for the Western Colorado Climate Division #048 for the 3-Month Season of January-March





Historically, temperatures for western Colorado during January-February-March were warmest during El Niño events and coldest during La Niña events, albeit a small difference. Temperatures during ENSO-neutral conditions were only slightly lower than those during El Niños.

Precipitation for western Colorado during the same three month period was nearly similar during El Nino and ENSO-neutral periods, and slightly greater during past La Niña events. If northwest Colorado had its own climate division, its precipitation during La Niñas would probably be much greater.

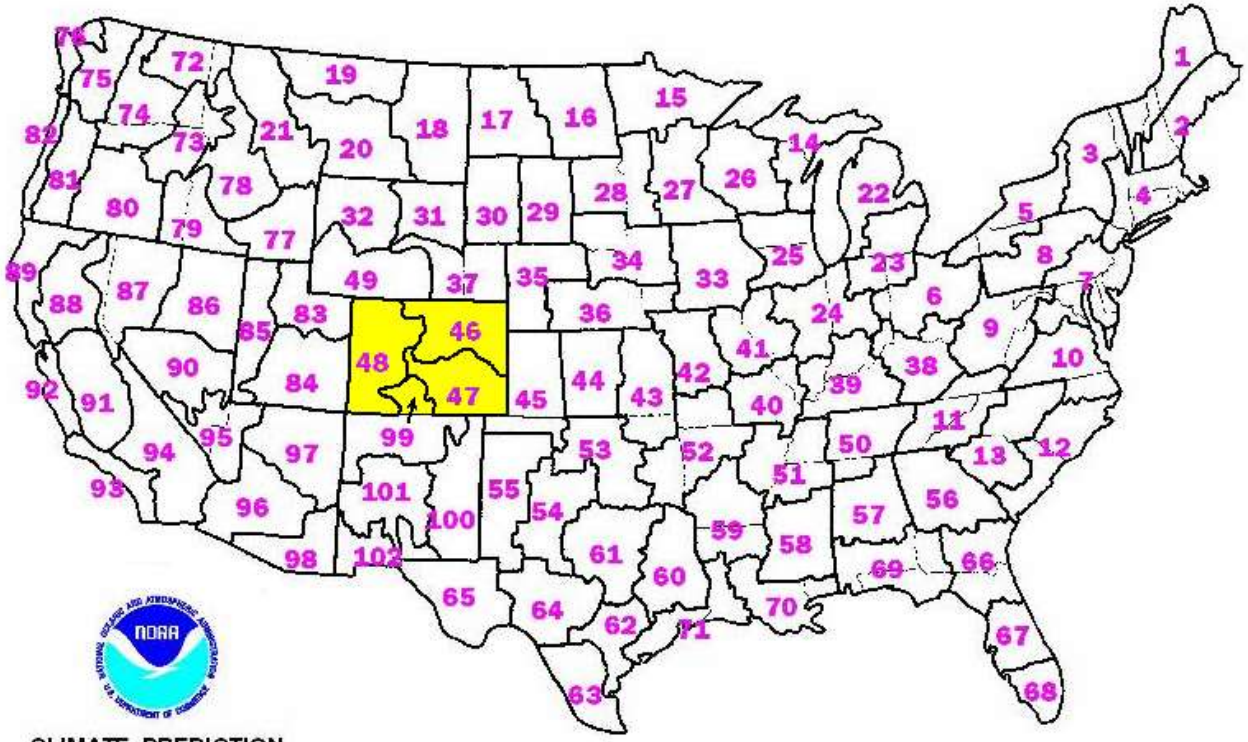
January- March 2012 Temperature and Precipitation Outlook for Colorado Issued by NOAA's Climate Prediction Center

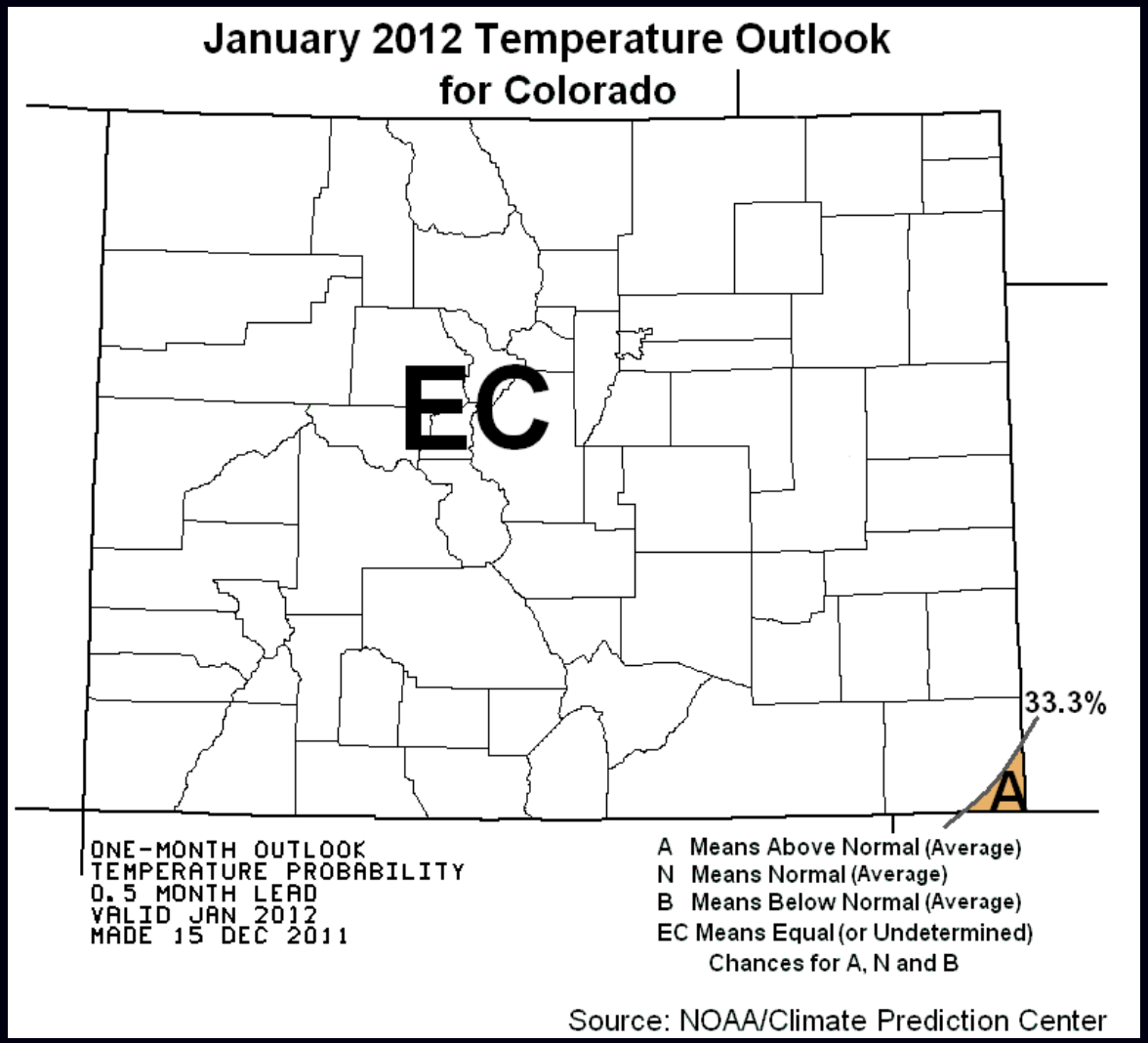
Climate Prediction Center Seasonal Outlooks

The National Weather Service Seasonal Climate Outlooks predict the probability of conditions being among the warmest/coldest or wettest/driest terciles of years compared to the period of record 1981-2010.

The outlooks indicate probability of being in three specific categories in reference to the 30-year climatology from 1981-2010. They are above, below and average.

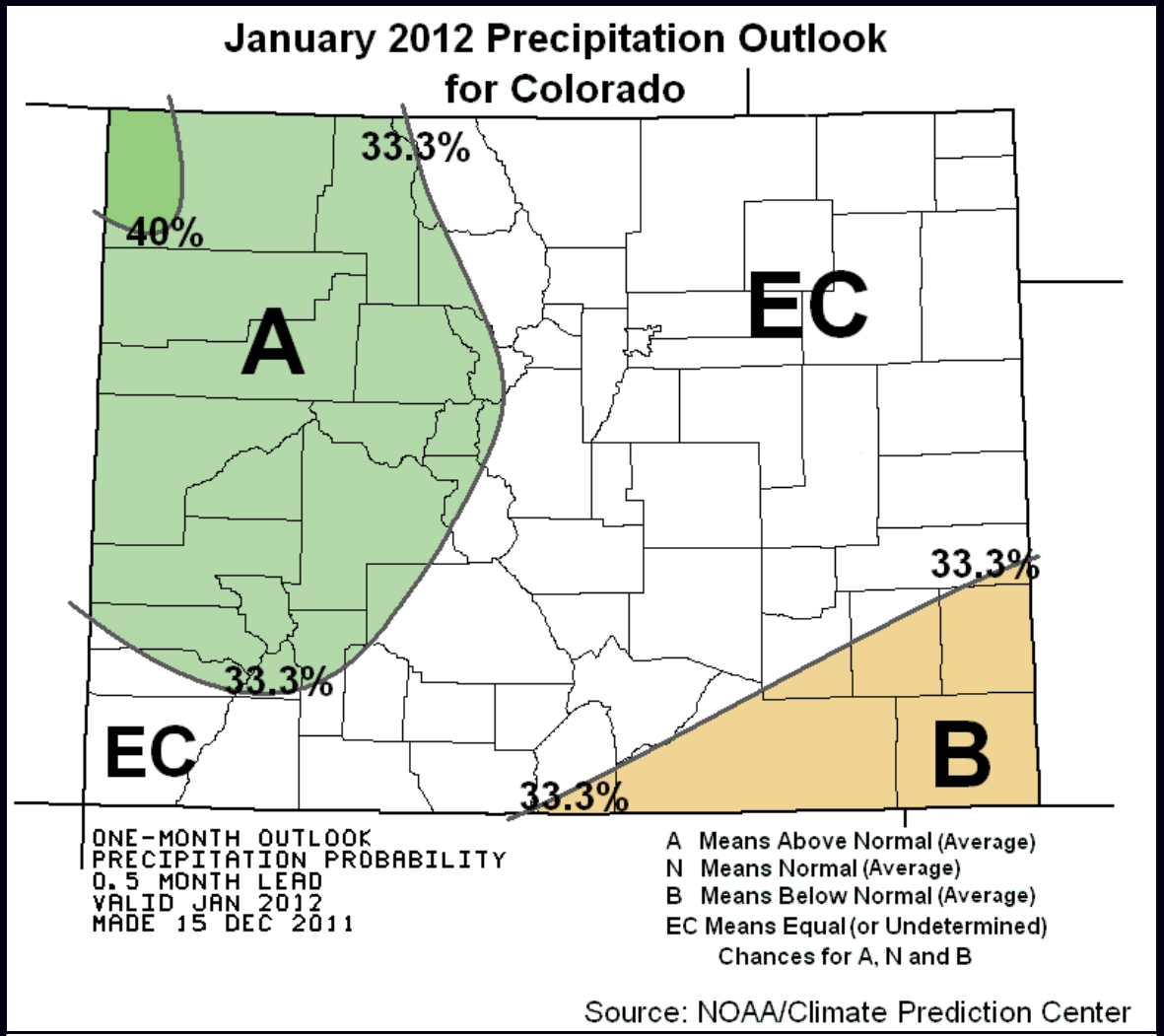
Remember, Climate Predicition Center (CPC) outlooks are made at the scale of the climate megadividions (see the map below).





January 2012 Temperature Outlook for Colorado

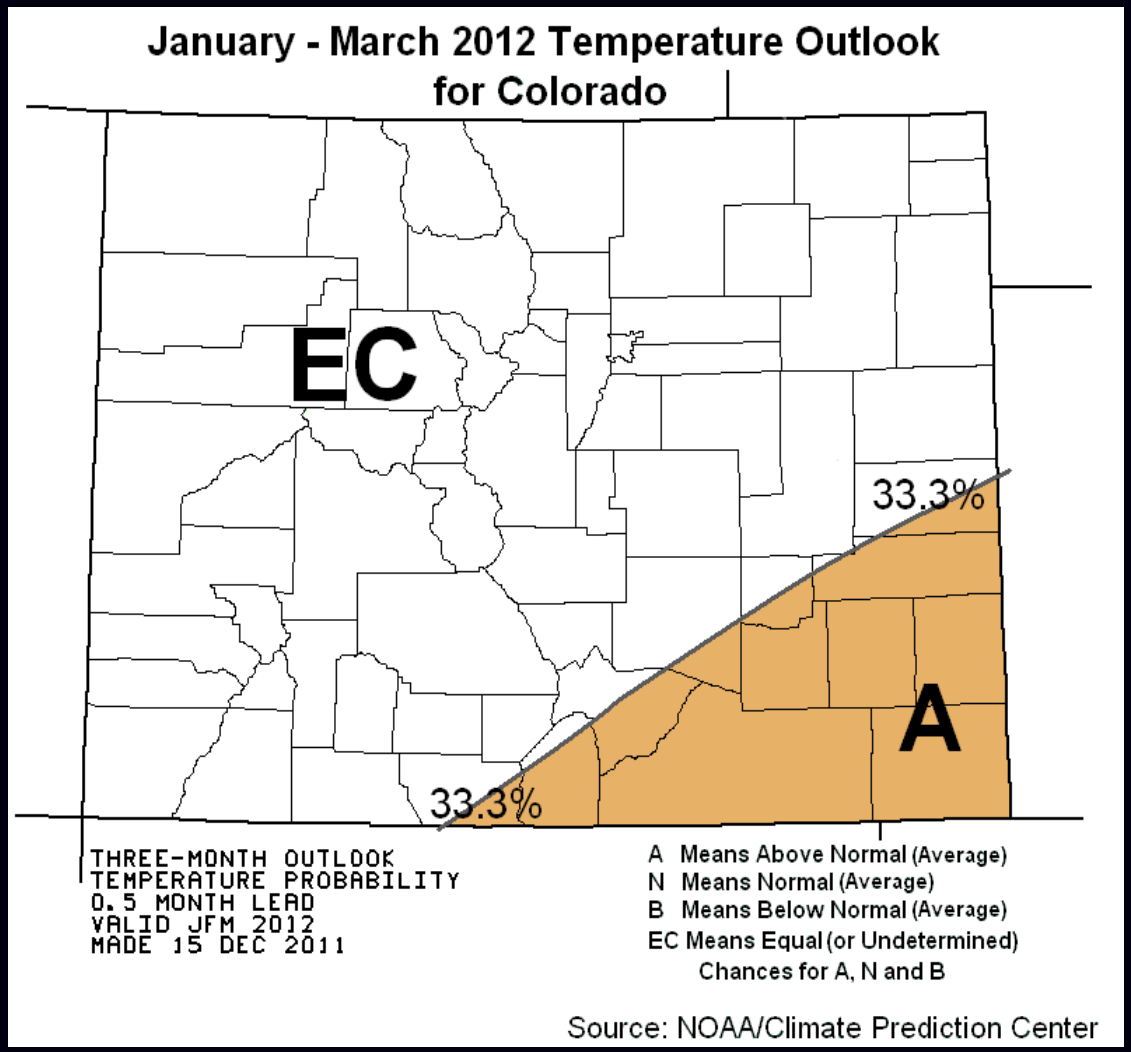
The latest one-month temperature outlook from NOAA's Climate Prediction Center (CPC) calls for an equal (or undeterminable) chance of above, below and near average temperatures essentially for all of Colorado during the month of January.



This probabilistic shift to above normal precipitation across northwest Colorado may be an indication of a large scale shift in the jet stream and a return to weather conditions commonly associated with La Niña.

January 2012 Precipitation Outlook for Colorado

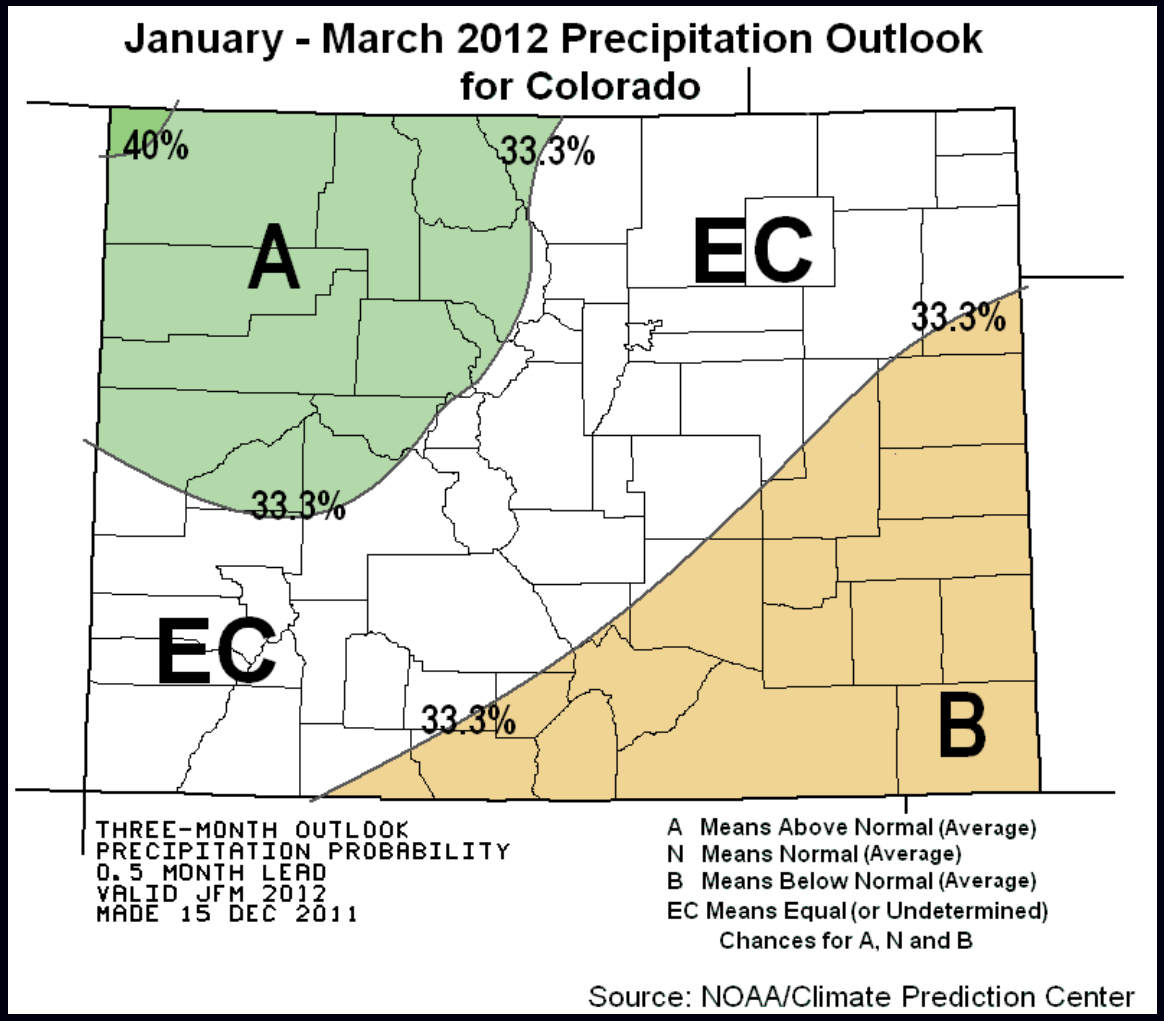
The outlook for January calls for at least a 33.3% chance for above average precipitation across north-west and west central Colorado, and at least a 33.3% chance for below average precipitation in the southeast corner of the state. For the reminder of the state, the outlook calls for an equal (or undeterminable) chance of above, below and near average precipitation during January.



January-March 2012 Temperature Outlook for Colorado

The 3-month temperature outlook from CPC calls for an equal (or undeterminable) chance of above, below and near average temperatures for all except the southeast corner of Colorado during the period January-March of 2012.

For the southeast corner of the state, odds are that temperatures during this period will be above average.



The probabilistic shift to above normal precipitation across northwest Colorado during the three month period January-March is a probable response to the return of La Niña conditions in the absence of El Nino-like effects produced by MJOs in the eastern Pacific.

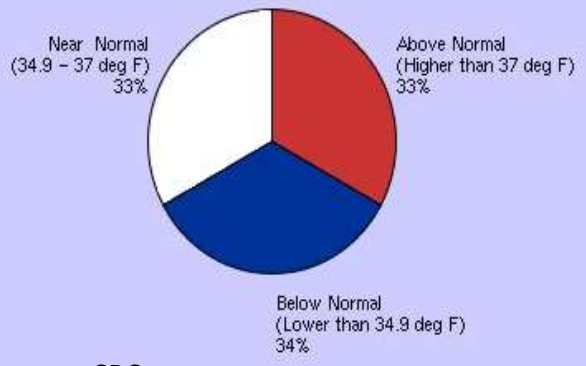
January-March 2012 Precipitation Outlook for Colorado

Last but not least, the latest 3-month precipitation outlook from CPC calls for above average precipitation (at least a 33.3% chance) across the northwest quarter of Colorado, and below average precipitation (at least a 33.3% chance) across the southeast corner of the state during the period January-March of 2012.

For the remainder of the state, CPC is calling for an equal (or undeterminable) chance of above, below and near average precipitation during this three month period—as indicated by the EC symbol.

Three Category Temperature Outlooks For Four Locations in Northeast Colorado

Three Category Temperature Outlook for Denver/Stapleton CO For the Period Jan-Feb-Mar 2012



Source: CPC

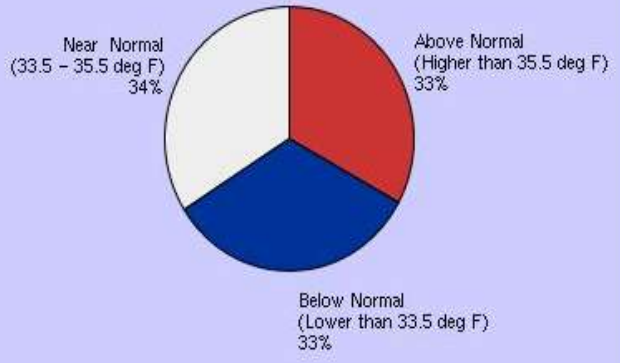
There is a 33.0% chance for the average temperature during this 3-month period to be higher than 37.0°F.

There is a 33.0% chance for the average temperature during the 3-month period to be between 34.9°and 37.0°F.

There is a 34.0% chance for the average temperature during this 3-month period to be lower than 34.9°F.

Based on the 1981-2010 climatological reference period

Three Category Temperature Outlook for Fort Collins CO For the Period Jan-Feb-Mar 2012



Source: CPC

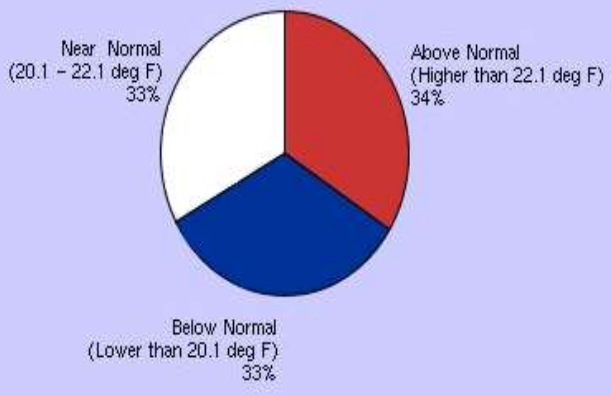
There is a 33.0% chance for the average temperature during this 3-month period to be higher than 35.5°F.

There is a 34.0% chance for the average temperature during the 3-month period to be between 33.5°and 35.5°F.

There is a 33.0% chance for the average temperature during this 3-month period to be lower than 33.5°F.

Based on the 1981-2010 climatological reference period

Three Category Temperature Outlook for Dillion CO For the Period Jan-Feb-Mar 2012



Source: CPC

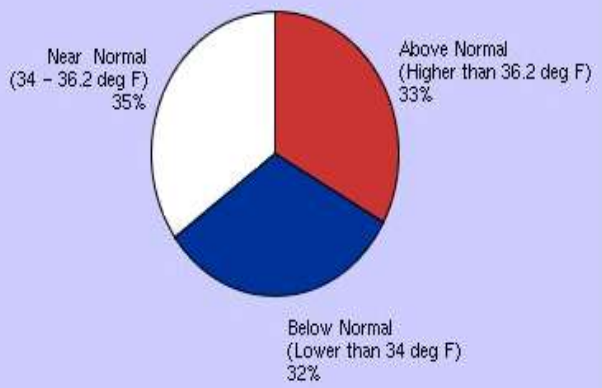
There is a 34.0% chance for the average temperature during this 3-month period to be higher than 22.1°F.

There is a 33.0% chance for the average temperature during the 3-month period to be between 20.1° and 22.1°F

There is a 33.0% chance for the average temperature during this 3-month period to be lower than 20.1°F.

Based on the 1981-2010 climatological reference period

Three Category Temperature Outlook for Sterling CO For the Period of Jan-Feb-Mar 2012



Source: CPC

There is a 33.0% chance for the average temperature during this 3-month period to be higher than 36.2°F.

There is a 34.0% chance for the average temperature during the 3-month period to be between 34.0° and 36.2°F.

There is a 32.0% chance for the average temperature during this 3-month period to be lower than 34.0°F

Based on the 1981-2010 climatological reference period

Summing It Up…

- Climate models predict a continuation of a weak to moderate La Niña through the end of the 2011-2012 winter season, then a gradual transition to ENSO-neutral conditions during the spring of 2012.
- During previous La Niñas, winter time precipitation in Colorado was normally above average for western and northwestern parts of the state, and near to below average for southern and eastern portions of Colorado. Furthermore, winter time temperatures were generally below average across northwest and north central Colorado, and near to above average for southern and eastern sections of the state.
- During this past autumn, weather patterns in Colorado normally associated with La Niña events were masked by interseasonal variations in temperature and precipitation produced by a couple of strongly organized tropical waves or Madden-Julian Oscillations (MJOs) that propagated eastward across the eastern tropical Pacific Ocean during the period.
- The latest outlook from the Climate Prediction Center calls for at least a 33.3% chance for above average precipitation across west central and northwest Colorado and an equally similar chance for near to below average precipitation for the rest of the state during the next few months. This probabilistic shift in precipitation reflects a probable return to atmospheric conditions normally associated with an La Niña of at least moderate strength.